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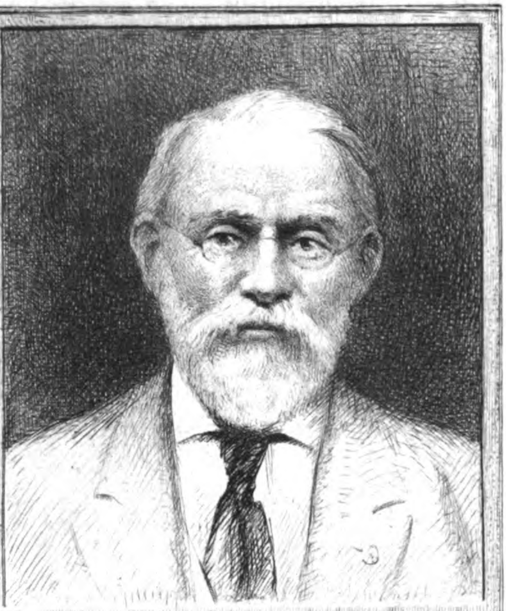

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United service Institution of India.

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By order of the Council,
R. SOUTHEY, LIEUT.,
Secretary.

Gentlemen who may wish to become members are requested to be kind enough to forward their donations and subscriptions at the time they express a wish to join the Institution.

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    - (*g.*) Short Notes on professional subjects.
    - (*h.*) Notices of inventions of military importance.
    - (*i.*) Correspondence on professional subjects.
    - (*j.*) Occasional Papers.

IV.—Composition.

1. The following shall be solicited to be Patron and Vice-Patrons *ex-officio* :—

Patron.

His Excellency the Viceroy and Governor-General of India.

Vice-Patrons.

His Excellency the Commander-in-Chief in India.
Ditto the Governor of Madras.
Ditto ditto of Bombay.
His Honor the Lieutenant-Governor of Bengal.
Ditto ditto ditto of N W. P. & Oudh.
Ditto ditto ditto of Punjab.
His Excellency the Naval Commander-in-Chief East Indies.
Ditto the Commander-in-Chief Madras Army.
Ditto ditto ditto Bombay Army.
The Military Member of the Viceregal Council.

Vice-Patrons will take precedence according to the date of their election.

2. Besides the above, Vice-Patrons shall be limited to members of the Royal Family, officers distinguished for their services, and members who have been benefactors to the Institution.

3. All officers of the Royal Navy and Army, and of Volunteer Corps in India and Gazetted Government officers, shall be entitled to become members without ballot on payment of the entrance fee and annual subscription.

V.—Government.

1. The Government of the Institution shall be vested in a Council at the Head-Quarters of the Army in India, to consist of 21 members, who should be, as generally as possible, representative of all branches of the forces in India. The names of officers willing to serve on the Council for each ensuing year shall be published at least one month before the election, and all members of the Institution, unable to attend, may record their votes for the Council by proxy.

2. The Adjutant-General and the Quarter-Master-General of the Army in India, and the Military Secretary to His Excellency the Commander-in Chief in India, are *ex-officio* members of the Council.

3. Seven of the members of the Council will retire annually by rotation, but may be re-elected if the Council consider it desirable.

4. An Executive Committee, consisting of a President and two members chosen from the Council, will be annually elected on the 1st May for the transaction of all the ordinary business of the Institution during the year.

5. The Commander-in-Chief of Madras and Bombay will be asked on the 1st March of each year to send in the names of three officers in each of those Presidencies for election as Members of Council.

6. The Executive Committee of the Council will annually nominate five officers of the Bengal Presidency, who, with the six from the two other Presidencies (para. 5.) will be put up to ballot for the seven annual vacancies.

7. Officers will be invited to become corresponding members to forward the objects of the Institution, and to communicate with the Council.

8. A Secretary shall be elected by the Council at the Head-Quarters of the Army in India for the purpose of keeping, under the orders of the

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5. [illegible] 1st May [illegible] Members of Council [illegible]

6. [illegible]

7. [illegible]

8. [illegible] Head Quarters of the Army [illegible]

Council, the Accounts, editing the Journal, and conducting correspondence, &c. He shall receive a monthly allowance of Rs. 100, and shall only hold the appointment for one year, unless the Council consider his re-appointment desirable.

9. The duties of the Council shall be to exercise a general control over the welfare and expenditure of the Institution. The Executive Committee will pass papers for publication.

10. The Executive Committee of the Council will frame such Bye-laws, for the general conduct of the Institution, as may appear to them necessary, subject to confirmation by the Council at the next General Meeting. All questions, which the Executive Committee are unable to dispose of, should be referred by the Secretary to all the members of the Council who are in Simla.

11. A General Meeting of the Council will take place on the 1st May for the election of the new members of the Council, the audit of the Accounts, award of the Gold Medal, and such other business as may be brought before it; and another, when necessary, on the 1st October to consider any questions connected with the Institution that require settlement prior to the close of the Simla season.

12. Three members of the Council will form a quorum, and the senior member will preside. There will be no formally elected Chairman or Vice-Chairman of the Council.

13. Non-commissioned officers and soldiers of the Army and Volunteer Corps, shall when practicable be permitted to attend meetings or to hear lectures, &c., and the introduction of a member shall be sufficient to admit non-subscribers for the same purpose, except when otherwise notified.

14. At the General Meeting of the Council a statement of the accounts and progress of the Institution will be laid before the Council by the Secretary. The accounts will be annually audited by a competent Auditor.

15. A list of Life and Ordinary Members will be annually printed and issued with the report of the General Meeting of 1st May.

16. The Financial year of the Institution commences on the 1st January.

17. An annual donation of Rs. 3,000 is received from the Government of India in support of the Institution.

VI.—Membership.

1. Life Members of the Institution will be admitted on the following terms :—

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* Subscribing members of the Royal United Service Institution, Whitehall, London, are not liable for entrance fee while the affiliation rules are in force.

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4. Messes or Regimental Libraries or Reading Rooms, &c., cannot be life-members.

5. If any member fails to pay his subscription for any financial year (ending 31st December) before the 1st June in the following year, a notice will be sent to him by the Secretary calling on him to pay. If the subscription is not paid by 1st January following his name will be struck off the roll of members.

6. When a member joins the Institution on or after the 1st October, having paid his first annual subscription, he will not be charged a second subscription on the following 1st January, but it will become due on 1st January of the second year.

By Order of the Council,
A. H. MASON, Captain,
Secy., U. S. I. of India.

BYE-LAWS.

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2. No remarks of a personal nature, or in any way subversive of discipline will be permitted.

3. Anonymous contributions under a *nom de plume* will not be accepted nor acknowledged. All contributions will be published under the name of the writer.

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Rules for the Regulations of Meetings and Debates of the United Service Institution of India.

1. The subject of all lectures and debates must be submitted for the sanction of the Executive Committee before such can be held.

2. The senior member present, being an officer of the navy or army, shall officiate as Chairman at meetings when no other Chairman has been specially invited.

3. Speakers should address their remarks to the Chairman and not to the meeting.

4. In the event of more than one member rising to speak at the same time, the Chairman's decision as to who shall be heard first shall be final.

5. If called upon to do so by the Chairman, a speaker shall at once sit down.

6. No remarks of a personal nature, or in any way subversive of discipline or harmony, will be permitted.

7. Speakers are requested to furnish the Secretary with a copy of their remarks, paper or lecture for publication in the Journal.

8. No interruptions will be permitted during the reading of a paper or speech of another member.

9. Meetings shall be broken up or adjourned only on the general vote of the members present, to be invited by the Chairman.

10. When the general public is admitted to lectures, &c., a certain part of the room is to be reserved for members and their friends accompanying them, the Secretary making the requisite arrangements.

11. Paid reporters will, under ordinary circumstances, be entertained at the expense of the Institution for noting down *discussions* only. When hired to take down a lecture or a paper read at the Institution, the report will be revised by the Secretary before publication in the Journal.

12. Accommodation will be reserved for representatives of the Press desirous to report lectures, papers read or discussions held at the Institution, but such reports, unless revised by the Secretary, will not be recognised as bearing the impress of the Institution.

By Order of the Council,
A. H. MASON, CAPT.,
Secy., U. S. I. of India.

United Service Institution of India Library.

REVISED RULES AND NOTICES.

1.—The Library is only open to Members of the United Service Institution of India, and Members are requested to look upon books and maps as not transferable to their friends.

2.—A Member will not be allowed to have from the Library, at one time, more than three books or sets of books, and 2 maps.

3.—Books and maps are only issued between the hours of 10 A.M. and 5 P.M. during the summer, and 10-30 A.M. and 4-30 P.M. during the winter.

4.—Before taking a book or map from the Library, a receipt must be signed which, with a counterfoil, will be kept by the Librarian. On the return of the book or map the Member returning it should ask that the receipt be either destroyed or handed over to him. The counterfoil will be cancelled by the Librarian.

5.—Books and maps for 3 months after receipt will be treated as New Books. These, together with all the works under the heading C.—Cyclopœdic, and all books and maps noted as *Confidential* or *Reference only* must not be removed from the Reading-Room.

6.—No particular limit is set to the number of days for which a Member in Simla may keep a book or map, the Council being desirous of making the Library as useful as possible to such Members as may be undergoing any particular course of study; but at the same time if, within a fortnight of the issue of a book or map to any Member, the book or map is required by any other Member the Secretary is authorized to desire its immediate return for fresh issue.

7.—Lost and defaced books or maps shall be replaced at the cost of the Member to whom they were issued. A book or map shall be held to be lost when a Member omits to return it on receipt of a registered cover from the Secretary, and on the expiry of 2 weeks (in the case of Members residing in England, 3 months) from the despatch of such a cover, if reasonable explanation be not forthcoming, a new copy shall be bought and charged in the Member's account. In the case of lost books that are out of print, the value shall be fixed by the Executive Sub-Committee and the amount, when received, spent in the purchase of a new book.

8.—Books and Maps are issued to Members at outstations under the above rules, and subject to the following further conditions: (*a*) all applications for books and maps should be accompanied by the requisite sum for postage, otherwise they will be sent bearing; (*b*) such books or maps must be returned *post paid* within three weeks of date of issue; (*c*) if at any time a book or map issued to a Member is required for reference by an intending lecturer, the Secretary is authorised to recall such book or map immediately, but he will re-issue it, when availble, and if desired, to the Member from whom it was re-called. In such cases the postage on re-call and re-issue will be paid by the Institution.

9.—Members are invited to note any books or maps which they think might with advantage be procured for the Institution. A list of the books or maps thus suggested will be submitted periodically to the Executive Committee, and action taken as may be deemed advisable.

10.—Presents of books and maps are solicited. These may be sent "bearing" to the Secretary, who will note them as "presented," and duly acknowledge their receipt.

11.—The issue of a book or map under these Rules to any Member implies the latter's compliance with the Rules and his willingness to have them, if necessary, enforced against him.

By order,
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Cotton & Morris: Printers, Simla.

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* Through a Press error No. 72 was wrongly headed Vol. XVII and the mistake was discovered too late for rectification. Nos. 70 to 72 should be bound in one Volume.

Resolved.—That
Colonel R. C. Hart, V.C., R.E.
Lt.-Colonel E. R. Elles, R.A.
Lt.-Colonel A. D. Anderson, R.A., be appointed Executive Committee for the ensuing year.

The decision of the Council of the Royal United Service Institution that the affiliation scheme be tried for another year was read and approved.

Resolved.—That the Institution be advertised in the papers, in substitution for the present system of circulars.

Resolved.—That with the approval of the Government of India, the names of all past and present medallists of the Institution be published in the Bengal Army List, in the same way as the names of Medallists of the Royal United Service Institution are published in the Quarterly Army List in England.

Certain modifications of the Regulations of the Institution were proposed and sanctioned, and it was

Resolved.—That the Regulations as revised be published.

The Balance Sheet for the past year, Roll of members joined, resigned &c., and List of additions to Library and exchanges are appended.

A. H. MASON, CAPTAIN,
Secretary, U. S. I. of India.

ARTHURVILLE, *Simla,*

THE SECRETARY,
United Service Institution,
Simla.

SIR,

I have the honor to submit herewith a Balance Sheet of the United Service Institution for the Half-year ended 31st December 1888 duly audited.

The books have been kept in a satisfactory way.

I have &c.,
Your obedient servant,
THOMAS BEAN, *Auditor*

Dr. Balance Sheet United Service Institution of India for the months ended 31st December 1888. Cr.

RECEIPTS.	Rs.	A.	P.	Rs.	A.	P.
By Balance brought forward ...	......			572	11	2
,, Government Grant-in-aid ...	1,750	0	0	......		
,, Subscriptions, donations, &c., ...	3,235	8	0	......		
,, Miscellaneous receipts	495	15	0	......		
,, Interest on Investments	188	12	0	5,670	3	0
INVESTMENTS.						
,, Amount held in 4 per cent. Government Paper	4,000	0	0	.....		
Fixed deposit with Alliance Bank	2,500	0	0	6,500	0	0
Total	......			12,742	14	2

EXPENDITURE.	Rs.	A.	P.	Rs.	A.	P.
To Secretary's allowance	700	0	0	......		
,, Office Establishment	685	0	0	......		
,, Office and Establishment contingencies	52	6	0	......		
,, Office Stationery and Miscellaneous printing	20	8	0	......		
,, Library and Newspapers ...	81	2	0	......		
,, Postage	51	12	0	......		
,, Journals	662	9	0	......		
,, Rent of Premises	400	0	0	......		
,, Furniture	571	11	0	......		
,, Miscellaneous	311	14	10	3,536	14	10
By amount held in Government 4 per cent. Paper	4,000	0	0			
,, amount in deposit in Alliance Bank	2,500	0	0	6,500	0	0
,, amount in floating account with Alliance Bank	2,695	15	4			
,, In hands of Secretary	10	0	0	2,705	15	4
Total Rupees ...	......			12,742	14	2

Examined and found correct.
THOMAS BEAN,
Auditor.
22*nd March* 1889.

EXECUTIVE COMMITTEE.
T. P. SMITH,
Major-General.
E. R. ELLES,
Lieut.-Colonel.

R. SOUTHEY, LIEUT.,
Secretary.

Resolved.—That
Colonel R. C. Hart, V.C., R.E.
Lt.-Colonel E. R. Elles, R.A.
Lt.-Colonel A. D. Anderson, R.A., be appointed Executive Committee for the ensuing year.

The decision of the Council of the Royal United Service Institution that the affiliation scheme be tried for another year was read and approved.

Resolved.—That the Institution be advertised in the papers, in substitution for the present system of circulars.

Resolved.—That with the approval of the Government of India, the names of all past and present medallists of the Institution be published in the Bengal Army List, in the same way as the names of Medallists of the Royal United Service Institution are published in the Quarterly Army List in England.

Certain modifications of the Regulations of the Institution were proposed and sanctioned, and it was

Resolved.—That the Regulations as revised be published.

The Balance Sheet for the past year, Roll of members joined, resigned &c., and List of additions to Library and exchanges are appended.

A. H. MASON, CAPTAIN,
Secretary, U. S. I. of India.

ARTHURVILLE, *Simla,*

THE SECRETARY,
United Service Institution,
Simla.

SIR,

I have the honor to submit herewith a Balance Sheet of the United Service Institution for the Half-year ended 31st December 1888 duly audited.

The books have been kept in a satisfactory way.

I have &c.,
Your obedient servant,
THOMAS BEAN, *Auditor*

Dr. [illegible] United Service Institution of India for the months ended 31st December 1858. **Cr.**

RECEIPTS.	Rs. A. P.	Rs. A. P.
To Balance [illegible]		[illegible] 11 2
[illegible]	1[illegible] 0 0	
[illegible]	3,[illegible]	
[illegible]	[illegible] 1[illegible] 0	
[illegible]	1[illegible] 12 0	[illegible] 3 0
[illegible]		
[illegible]	4[illegible] 0 0	
[illegible]	[illegible] 0 0	[illegible] 0 0
Total		12,742 14 2

EXPENDITURE.	Rs. A. P.	Rs. A. P.
By [illegible] wages ...	[illegible] 0 0	
„ [illegible]	6[illegible]5 0 0	
„ [illegible] Establishment con-[illegible]	32 6 0	
„ [illegible] Stationery and Miscel-[illegible]	20 8 0	
„ [illegible] and Newspapers	81 2 0	
„ [illegible]	51 12 0	
„ [illegible]	662 9 0	
„ [illegible] Premises	440 0 0	
„ [illegible]	571 11 0	
„ Miscellaneous	311 14 10	3,536 14 10
By amount held in Government 4 per cent Paper	4,000 0 0	
„ [illegible] in deposit in Alliance Bank	2,500 0 0	6,500 0 0
„ amount [illegible] account with [illegible] Bank	2,695 15 4	
„ In hands of Secretary ...	10 0 0	2,705 15 4
Total Rupees ..	......	12,742 14 2

[illegible]
[illegible] MANSERGH[illegible]
[illegible] 1889

EXECUTIVE COMMITTEE
[illegible] P. SMITH,
Major-General.
E. R. ELLES,
Lieut.-Colonel.

R. SOUTHEY, Lieut.,
Secretary.

Roll of Members joined, during the year, 1888-89.

Rank.	Name.	Corps.
Secretary	Officers' Mess	Malwa Bhil Corps.
H. E. Rear Admiral K.C.B., C.M.G.,	Fremantle, Hon'ble Sir E. R.	Commander-in-Chief E. I. Station.
Major	Ferrier, A. W.	Royal Artillery.
Colonel	Van Straubenzee, T.	Royal Artillery.
Lieutenant	Mackenzie, R.	Royal Engineers.
Captain	Williams, G.	Royal Engineers.
Lieutenant	Massy, G.	Norfolk Regiment.
Captain	Lawford, E. M.	1st Madras Lancers.
Major	Brunker, H. M.	Scottish Rifles.
Lieutenant	Jacob, H. F.	Bombay Staff Corps.
Major	Balfe, E.	Bombay Staff Corps.
Colonel	Pritchard, H.	Acct. Genl. Mily. D.
Lieutenant	Godfrey, S. H.	Bombay Staff Corps.
Major	Woodgate, E. R. P.	2nd K. O. Roy. Lancaster Regt.
Secretary	Officers' Mess	3rd Bombay Infantry.
Colonel	Shakespear, G. R.	10th Bengal Lancers.
Lieutenant	Longley, J. R.	East Surrey Regt.
Surgeon-Major	Roe, W. H. C.	I. M. S.
Secretary	Officers' Mess,	HazaraMountainBaty.
Secretary	Officers' Mess,	16th Bengal Cavalry.
Lieutenant	Snow, R. H. P.	2nd Wiltshire Regt.
Captain	Gibbs, M.	31st Punjab Infantry.
Major	Burnaby, B. B.	East Surrey Regt.
Lieutenant	Walters, H. F.	22nd Bombay Infy.
Lieutenant	Petrie, R. D.	Royal Engineers.
Captain	Davison, K. S.	4th Bengal Cavalry.
Secretary	Officers Mess,	20th Madras Infantry.
Lt.-Colonel	Hall, A. C. B.	1st L. N. Lanc. Regt.
Major	Sawyer, C. E.	Ditto.
Captain	Lindesay, E.	Ditto.
Captain	Dowell, G. W.	Ditto.
Lieutenant	Logan, F. C. L.	Ditto.
Captain	Prichard, G. M.	D. S. Officer.
Captain	Ormerod, G. S.	Royal Mun. Fusiliers.
Br.-General	Purvis, H. M.	Royal Artillery.
Lt.-Colonel	Mackinnon, D.	Leinster Regiment.
Lieutenant	Bingley, A. H.	7th Bengal Infantry.
Lieutenant	Cadell, A.	38th Bengal Infantry.
Captain	Wedderburn, J. M.	38th Bengal Infantry.
Lieutenant	Stevens, M.	D. A. C. General.
Captain	Davies, O. E. M.	2nd Cheshire Regt.

Rank.	Name.	Corps.
Major	Jones, W. H. D.	7th Bombay Cavalry.
Lt.-Colonel	Adams, H. C.	2nd Oxford L. Infy.
Major	Hewat, H. R. C.	Royal Scots. Fusrs.
Lieutenant	Williamson, O. C.	Royal Artillery.
Secretary	Officers' Mess,	30th Punjab Infantry.
Captain	Burn, A. E. P.	27th Punjab Infantry.
Lt.-Colonel	Dundas, H. L.	A. A. G., Poona.
Colonel, D.S.O.	Murray K. D.	A. A. G. Simla.
Major	Grant, S.	Royal Engineers.
Major, V.C.	Ridgeway, R. K.,	A. Q. M. G., Simla.
Surgeon-Major	Gubbins, W. L.	Medical Staff.
Secretary	Officers' Mess,	18th Bengal Lancers.
Captain	Bray, N.	Inniskilling Fusiliers.
Captain	Du Moulin, L. E.	Royal Sussex Regt.
Colonel, V.C.	Hart R. C.	Royal Engineers.
Lieutenant	Barrow, G. de S.	4th Bengal Cavalry.
Colonel	Symons, W. P.	South Wales Borderers
Lieutenant	Adams, W. A.	Liverpool Regt.
Major	Stawell, G. D.	Devonshire. Regt.
Colonel, C. B.	Ardagh, J. C.	Royal Engineers.
Lieutenant	Manners-Smith, J.	Bengal Staff Corps.
Secretary	Ferozepore Club.	
Colonel, D.S.O.	O'Grady Haly. R. H.	Suffolk Regiment.
Br.-General. C.B.	Combe, B. A.,	Comdg. Sind Dist.
Major Genl. C.B.,	East, C. J.	Comdg. Secunderabad District.
Lieutenant	Heard E S.	Northumberland Fus.
Lieutenant	Shewell, P. G.	1st Punjab Infantry.
Lieutenant	Markham, C. J.	4th K. R. Rifles.
Lieutenant	Newnham, A. T. H.	10th Bombay Infy.
Lt.-Colonel	Saward, M. H.	Royal Artillery.
Major-General K.C.S.I., C.B.	Browne, Sir Jas.	Royal Engineers.
Lieutenant	Bythell, W. J.	Ditto.

Removed to N. E. list on retirement or transfer from India.

Colonel	Prendergast, M. M.	4th Bengal Cavalry,
Col., V.C., A.D.C.	Bell, M. S.	Royal Engineers.
Lieutenant	Smith, W. J.	2nd Punjab V. Rifles.
Colonel	Burnett, C. J.	East Yorkshire Regt.
Colonel	Withers, J.	25th Bombay Infy.
Major General	Cherry, E. M.	Bengal Staff Corps.
Major Genl. K.C.B.	Dillon, M.	

United Service Institution of India.

PROCEEDINGS of the Half-yearly Meeting of the Council of the United Service Institution of India, held at Simla on the 28th June, 1889.

Present:

HIS EXCELLENCY THE COMMANDER-IN-CHIEF, *in the Chair.*

Major-General T. P. SMITH, R. A.
Major-General W. K. ELLES, C.B., A. D. C., *Adjutant-Genl. in India.*
Major-General SIR JAMES BROWNE, K.C.S.I., C.B., R. E. *Quarter-Master General in India.*
Brig.-General C. E. NAIRNE, C. B., R. A., *Inspector General of Artillery in India.*
Colonel A. R. D. MACKENZIE, C.B., A. D. C.
Colonel R. POLE-CAREW, C.B., *Military Secretary to His Excellency the Commander-in-Chief.*
Lieut.-Colonel E. R. ELLES, R.A.
Lieut.-Colonel A. D. ANDERSON, R.A., *Secretary, Mobilisation Committee.*
Major E. G. BARROW, B. S. C., *Assistant Secretary to Government of India, Military Department.*
Capt. A. H. MASON, R. E., *Secretary.*

The accounts for the half-year ending 31st December 1888 and the Auditor's Report were read and passed.

The Secretary was instructed to take steps for the early realization of all arrears of members' subscriptions.

The Secretary was also instructed to use every endeavour to improve the Library and Reading Room of the Institution.

The following statement showing the present numbers on the rolls of the Institution was read.

	Life Members.	Ordinary.	Affiliated.	Subscribers to Journal.	Exchange and free list.
Joined from 1st June 1888 to 28th June 1889	3	53	8	7	...
Removed to non-effective list on retirement or transfer to Europe	4	65	...	...	...
Resigned	...	17	...	10	...
Died	3	10	...	...	...
On the rolls on 28th June 1889 ...	46	461	11	114	34

PRIZE ESSAYS.

The report of the referees on the Prize Essays was read.

Resolved.—That in accordance with the decision of two out of the three referees the Gold Medal be awarded to the Essay with the motto

"*Strangers in a Strange land.*" (Captain B. Duff, 9th Ben. Infantry).

The Essay

"*Vicinus Urit Ucalegon*" (Captain A. H. Mason, R. E.)

was considered the second best, and it was decided that these two Essays should be printed in the Journal *in extenso*.

Essays were also received from

"*To the utmost of our power.*"

"*The blast of war blows in our ears.*

*　　*　　*

"*Stiffen the sinews.*"

"*Why then 'tis time to arm and give direction.*"

"*Quot homines tot sententiæ.*"

And it was decided that extracts from these should be published in the Journal.

The Council beg to acknowledge the valuable services rendered by the referees.

Resolved.—That the subject for next year's Essay shall be :—

"THE ORGANIZATION AND EMPLOYMENT IN WAR OF NATIVE CAVALRY."

The following officers retire from the Council having served three years.

Major General Sir Geo. Greaves, K.C.B., K.C.M.G.
Brigr.-General E. Faunce, M.S.C.
Colonel H. R. B. Worsley, C.B., B.S.C.
Colonel A. F. Hamilton, R.E.
Colonel G. de C. Morton, Warwickshire Regiment.
Lt.-Colonel E. R. Elles, R.A.
Major F. W. Hemming, Mily. Secy. to H. E. the C.-in-C. Madras.
Captain W. J. B. Bird, B.S.C.

Resolved.—That

Major-General Sir Geo. Greaves, K.C.B., K.C.M.G.
Brigr.-General E. Faunce, M.S.C.
Colonel A. F. Hamilton, R.E.
Lt.-Colonel E. R. Elles, R.A.
Major F. W. Hemming, be re-elected ; and that
Brigr.-General Luck, C.B.
Colonel R. C. Hart, V.C. R.E.
Lt.-Colonel P. J. Maitland, BO. S. C., be elected to fill the remaining vacancies on the Council.

Resolved.—That Captain A. H Mason, be confirmed in the appointment of Secretary.

Rank.*	Name.	Corps.
Major	Goodwyn, J. E.	East Lancashire Regt.
Lieut.-Colonel	Grey, L. J. H.	Bengal Staff Corps.
Colonel, C.I.E.	Robertson, J.	B. U. L.
Captain	Simpson, H. C. C. D.	Royal Artillery.
Colonel	Watts, J. G.	Bombay Staff Corps.
Captain	Wheeler, O. E.	Leicestershire Regt.
Vety. Surgeon	Mills, J.	
Colonel	Hutchinson, H. Mc. L.	
Major	Paget, H.	7th Hussars.
Colonel	Boswell, C.	Bengal Staff Corps.
Colonel	Martin, C.	1st C. I. Horse.
Major	Jerrard, F. B. J.	West Riding Regt.
Colonel	Court, H. M.	15th Bengal Cavalry.
Esq.,	Barnes, H.	P. W. D.
Colonel	Higginson, C. T. M.	G. L. C.
Colonel	Morton, G. de C.	Warwickshire Regt.
Lieutenant, D.S.O.	Stanton, H. E.	Royal Artillery,
Colonel	Beddy, E.	29th Punjab Infantry
Dy. Surgn. Genl. C.I.E.	Dallas, A. M.	I. M. S.
Colonel C.B.,	Hunt, J. V.,	Bengal Staff Corps.
Colonel	Lang, A. M.	Royal Engineers.
Major	Plowden, T. J.	Bengal Staff Corps.
K.C.S.I. C.I.E.	Aitchison, Sir Charles	C. S.
Lieut.-Colonel	Clutterbuck, T. S. Q.	7th Bengal Infantry.
Colonel C.B.	Hills, J.	Royal Engineers.
Colonel A.D.C.	Stewart, R. McG.,	Royal Artillery.
Lieut.-Colonel	Mackinnon, D.	Leinster Regiment.
Br.-General	Purvis, H. M.	Royal Artillery.
Major	Lawrie, J. A.	Royal Artillery.
Major	Trench, H. A.	2nd Queen's Regt.
Major	Cherry, H. A.	Northumberland Frs.
Major	Yule, W. A.	Royal Scots Fusiliers.
Lieut.-Colonel	Fletcher, H. A.	6th Bengal Cavalry.
Major	Gubbins, C. E.	Hyd. Contgt. Cavalry.
Colonel	Connolly, A.	Malwa Bhil Corps.
Surgn.-Major	O'Farrell, T.	Medical Staff.
Colonel	Munro, C. A.	Bengal Staff Corps.
Colonel C.B., V.C.,	Moore, A. T.,	Bombay Staff Corps.
Colonel	Barnett, H. C. B.	Madras Staff Corps.
Captain	Hoskyns, C.	Royal Engineers.
Esq.,	Blanford H. F.	
Col. C.B., A.D.C.	Chapman, E. F.	Royal Artillery.
Captain	Gossett, E. A. G.	Derbyshire Regiment.

Rank.	Name.	Corps.
Major	Hammond, P. H.	Royal Artillery.
Col. K.C.B., C.S.I.,	Lockhart, Sir W.S.A.	General List Infy.
Captain	Grierson, J. M.	Royal Artillery.
Major-Genl. C.B.	Macfarlan, D.	Royal Artillery.
Lieut.-Colonel	Magan, T. S.	Madras Staff Corps.
Captain	Malet, J. W.	Northumberland Frs
Captain	Maxwell, R. C.	Royal Engineers.
Major	Mayne, M.	Bombay Staff Corps.
Major	Moore, G. M. J.	Royal Artillery.
Lieut-Colonel	O'Connell, J.	B. B. & C. I. Volrs.
Lieutenant	Pendlebury, W.	B. B. & C. I. Volrs.
Major-General	Rowlands, H.	
Lieutenant	Adams, W. A.	Liverpool Regiment.
Colonel	Bainbridge, F. T.	Bengal Staff Corps.
Colonel C.B.,	Upperton, J.,	Bengal Staff Corps.
Colonel	Watson, T. J.	Bengal Staff Corps.
Captain	Haines, G.	R. Warwickshire Regt
Colonel	Chapman, H.	8th Bengal Cavalry.
	Resigned.	
Major	Strahan, G.	Royal Engineers.
Captain,	Masters, E. S.	Bhopal Battalion.
Esq.,	Oliver, W. J.	
Colonel	Coussmaker, M. F.	19th Bombay Infy.
Captain	Clibborn, J.	Royal Engineers.
Captain	Reilly, B. L.	Bengal Staff Corps.
Lieutenant	Peile, B.	20th Bombay Infy.
Esq.,	Sanderson G. P.	
Major	Abbott, A. K.	40th Bengal Infantry.
Lieut.-Colonel	Babington, C. W.	3rd Bengal Infantry.
Colonel	Bartholomew, R.	Bengal Staff Corps.
Esq.,	Lane, J. H.	Telegraph Deptt.
Colonel	Holberton, T. N.	Royal Artillery.
Captain	Beckham, L. G.	1-4th Bombay Rifle.
Captain	MacMahon, G. F. W.	Bombay Staff Corps.
Genl. Lord, G.C.B.	Chelmsford,	
Dr., C.I.E.,	Watt, G.	
	Dead.	
Captain	Urmston, H. B.	6th Punjab Infantry.
Colonel	Ward, D.	Royal Engineers.
Lieutenant	Jephson, W. C.	Bengal Staff Corps.
Major	Corse Scott, J.	1st Gurkhas.
Colonel C.B.	Crookshank, A. C. W.	34th Pioneers.

Rank.	Name.	Corps.
Captain, D.S.O....	Beley, H. H, ...	25th Punjab Infantry
Captain ...	Mackenzie, H. M, ...	9th Bengal Lancers
Colonel ...	Wace, E. G, ...	Bengal Staff Corps.
Duke ...	Buckingham and Chandos ...	
Colonel ...	Coddington, F.	Bengal Staff Corps.
Colonel ...	Shakespear, H. A, ...	Bengal Staff Corps.
Captain ...	Shields, H.	2nd P. V Rifles.
Esq., ...	Kelly, M.A.	Public Works Dept.

Subscribers resigned.

Rank.	Name.	Corps.
...	Soldiers' Library, ...	2nd Queen's Regt.
...	Scientific Library, ...	Sappers and Miners.
...	Soldiers' Library, ...	East Surrey Regt.
...	Officers' Mess, ...	C. I. Horse.
...	Regimental Reading Room ...	2nd Wiltshire Regt.
...	Officers' Mess, ...	13th Bombay Infy.
...	Officer Commanding ...	Cawnpore Rifle Volrs.
...	Officers' Mess, ...	Carabineers.
...	Club, ...	B. B. & C. I. Ry. Volrs.
...	Officers' Mess	Royal Fusiliers.
...	Officers' Mess	16th Bengal Infantry.

Members joined in July 1889.

Rank.	Name.	Corps.
Colonel, C.B. ...	Woodthorpe, R. G. ...	Royal Engineers.
Maj. Genl., K.C.B. [K.C.B.	Hudson, Sir J.	Comdg. Allahabad District.
Maj.-Genl., V. C.	White, Sir G.	Comdg. Quetta Dist.
Captain ...	Chambers, O. A.	R. Warwickshire Regt
Major ...	Ward, A. E.	Royal Engineers.
Captain ...	Hume, C. V.	Royal Artillery.
Surgn.-Major ...	Beatson, C. H.	Secy. to Surgn.-Genl, H. M. Forces.
Esquire, ...	Robertson, F. A.	Civil Service.
Colonel ...	Rogers, G. W. N.	2d Bn. Roy. Irish Regt.
Lt.-Colonel ...	Hamilton Ian	A.A.G. for Musketry.
Colonel ...	Sanderson, H. B.	Judge Advocate Genl.
Lieut.-Colonel ...	Kinsman, H. J.	Royal Artillery.
Captain ...	Forde, L. J. E.	Royal Artillery.
Lieutenant ...	Nathan, M.	Royal Engineers.
Captain ...	Bradshaw, L. J. E.	35th Sikhs.
Surgn.-Genl. M.B.	Thomson, W. A., ...	H. M Forces.
Lieut. [C.I.E.	Forbes, L. A.	2-3rd Gurkhas.
The Hon'ble C.S.I.	Hutchins, P. P.	Viceregal Council.
Colonel ...	Barton, G.	Royal Fusiliers.
Captain ...	Beatson, W. J. A.	P-4th Royal Artillery.

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Military Catechism.
Siam and the Siamese.
History of the Madras Army.
Professional Papers of the Corps of Royal Engineers.
Infantry Fire Tactics. Mayne.
Echoes from Old Calcutta. Busteed.
Kohat Gazetteer.
Ludhiana ditto.
Punjab Gazetteer.
Letters on Tactics and Organization. Maude.
Report of Ben. Pres. Rifle Assn.
Records of 2nd Sikh Infantry.
Records of No. 4 Mountain Battery.
Digest of Services of 1st Punjab Infantry.
The Sahara and Soudan.
Hobson Jobson. Yule.
Armed Strength of German Empire.
The Life of Lord Lawrence.
Kraft's Letters on Artillery.
The Indian Mutiny. Kaye and Malleson.
The Life of Sir Charles MacGregor.
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Indian Grasses. Symonds.
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Veterinary Hygiene. Smith.
Stable Management. Meyrick.
Notes on Shoeing Horses. Fitzwygram.
Practical Horse Shoting. Fleming
Horse Training. Hayes.
The Horse-keeper. Fleming.
England and Russia. Yates.

EXCHANGES.

The United States Cavalry Association Journal.
The Journal of the United Service Institution of New South Wales.

Rank.	Name.	Corps.
Br. General	Adam, F. J. S.	Q. M. Genl. Bombay Army.
Captain	Adams R. B.	Corps of Guides (Queen Own)
Lt.-Col.	Adams, H. C.	Oxfordshire L. I.
	Adjutant Genl. in India	
*Captain	Adye, G.	1st Regt. of Cav. Hyd. Contg.
Lieut.	Aitken, A. E.	19th Bombay Infantry.
Captain	Allen, B. M.	4th Punjab Infantry.
*Major	Anderson, A. D.	Royal Artillery.
Lieut.	Anderson, F. O.	Commandant Burma Police.
Col. C. B.	Anderson, W. C.	3rd Punjab Cavalry.
Col. C. B.	Badcock, A. R.	Comy. General in Chief.
Lieut.	Baird, J. Mc. D.	44th Goorkha Light Infantry.
Major	Baker, R. H. S.	R/3 Royal Artillery,
Major-Genl. K. C. B.	Baker, Sir T. D.	Comdg. R. Pindi District.
Captain	Balfe, E.	Assistant J. A. G.
Colonel	Bance, L. B.	15th Madras Infantry.
Major	Barlow, J. A.	D. A. A. G. for Musketry.
Major	Barrow, E. G.	Asst. Secy. Mily. Dept.
Lieut.	Barrow, G. de S.	4th Bengal Cavalry.
Major	Battye, F. D.	Corps of Guides, (Qn's. Own)
Hon'ble K. C. S. I.	Bayley, Sir Steuart C.	Lt.-Govr. Bengal.
Colonel	Bax, W. I.	D. S. Officer.
Captain	Bean, T. S.	2nd P. Vol. Rifle Corps.
Lt.-Col.	Becher, A. W. R.	16th Bengal Cavalry.
Col. C. B.	Beckett, S.	38th Bengal Infantry.
Lt.-Col.	Begbie, A. G.	R. E. Acct. Genl. Govt. of India, P. W. D.
*Captain	Bell, A. W. C.	26th Bom. Infantry.
Br. General C. B.	Bengough, H. M.	Comdg. Secunderabad Dist.
Major	Benson, F. W.	17th Lancers.
Lt.-Col. V. C. C. I. E.	Beresford, Lord W.	M. S. to H. E. the Viceroy.
Lieut.	Biddulph, G. W.	E. Baty. A. Brigade, R.H.A.
Lieut.	Bingley, A. H.	7th Bengal Infantry.
Col. C. B.	Bird, G. C.	1st Punjab Cavalry.
Captain	Bird, W. J. B.	Mily. Accts. Department.
Captain	Birdwood, W. S.	3rd Bombay Infantry.
Lt.-Colonel C. I. E.	Bisset, W. S. S.	Royal Engineers.

* *Life Members.*

Rank.	Name.	Corps.
Captain	Blood, W. P.	Royal Irish Fusiliers.
Captain	Booth, L. E. B.	S. S. Officer, Rawal Pindi.
Lieut.	Boddy, R. J.	2nd Royal Scots Fusiliers.
Captain	Bodé, L. W.	Middlesex Regiment.
Captain	Bowyer, W. G.	R. E.
Major	Brackenbury, M. C.	R. E.
Dy. Surg. Gl.	Bradshaw, A. F.	Medical Staff.
Colonel	Brandreth, A. M.	R. E. Principal, T. College.
Captain	Bray, N. A.	Royal Inniskilling Fusiliers
Colonel	Bridges, C. H	22nd Punjab Infantry.
Major	Broadbent, J. E.	R.E., Asst. Secy Mily. Dept.
Major	Brough, J. F.	K. B., Royal Horse Arty.
Major-Genl. K.C.S.I., C.B.	Browne, Sir James	R.E. Qr. Mr. Genl. in India.
Colonel	Browne, S. J.	6th Punjab Infantry.
Lieutenant	Browning, A. R.	4th ditto.
Colonel	Bruce, Mc C. A.	4th ditto.
*Colonel	Bruce, E. A.	Asst. Comy. Genl., Madras.
Captain	Brunker, J. M. S.	Royal Horse Artillery.
Major	Brunker, H. M. E.	D. S. Officer, Mian Mir.
Esquire	Buckland, C. E.	Civil Service.
Captain	Buckland, P. A.	D. S. Officer, Umballa.
Lieut.-Col.	Buller, F. W.	District Supdt. of Police.
Captain	Bullock, G. M.	Devonshire Regiment.
Major	Burgess, F. F. R.	Mily. Accounts Department
Major	Burnaby, R B.	E. Survey.
Captain	Burn, A. G.	14th Madras Infantry.
Captain	Burn, A. E. P.	27th Punjab Infantry.
Captain	Burn Murdoch, J.	R. E.
Lieutenant	Burton, E. B.	17th Bengal Cavalry.
Major	Burton, F. C.	1st Bengal Cavalry.
Major	Burton, G. S.	2nd Norfolk Regiment.
Colonel	Bushman, H. A.	A. A. Genl. Army Hd. Qrs.
Lt.-Col. C. B.	Byng, T, R.	6th Madras Infantry.
Lieutenant	Bythell, W. J.	R. E, Survey Department.
Lt.-Col. V.C.	Cadell, T.	Chief Commissioner, Andaman Islands.
Lieutenant	Cadell, A.	38th Bengal Infantry.
Captain	Cahusac, W. F.	26th ditto.
Colonel	Caldecott, F. J.	Royal Artillery.
Lieutenant	Cameron, E. D. C.	5/1 Southern, Royal Arty.
*Lieutenant	Campbell, A. A. E.	25th Punjab Infantry.

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Rank.	Name.	Corps.
Major	Campbell, L. R. H. D.	1/3 Gurkhas.
Colonel C. B.	Campbell, R. B. P. P.	(C. of Guides) Queen's Own.
K. C. I. E.	Cappell, Sir A. J.	DirectorGenl. of Telegraphs.
Esquire	Carey. A. D.	Bombay Civil Service.
Esq., C. I. E.	Carnac Rivett, J. H.	Civil Service.
Captain	Carpendale, J. M.	8th Bengal Cavalry.
Lieutenant	Carpendale, P. M.	21st Punjab Infy.
Lieutenant	Carpendale, W. M.	8th Bengal Cavalry.
Captain	Carter, F. C.	D. S. Officer, Rawal Pindi.
Lt.-Colonel	Carre, G. T.	Royal Artillery.
Lt.-Colonel	Carrington, E.	Worcestershire Regt.
Lt.-Colonel	Cautley C. G.	Military Accounts Dept.
Major	Cave, C. D.	Suffolk Regiment.
Major D.S.O.	Channer, B.	2nd Bengal Infantry.
Captain	Chanter, E. J.	2nd Punjab Vol. Rifles.
Colonel	Chambers, C.	19th Madras Infantry.
Esquire	Chambers, N. R.	C. E.
Captain V.C.	Chase, W. St. L.	28th Bombay Infantry.
Hon'ble Lt. Genl. C. B., C.S.I., C.I.E.	Chesney, G. T.	R. E.
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Esq., C. I. E.	Christie, James, T.	Asst. I. Genl. Police, Punjab
Captain	Cleeve, W. F.	Royal Artillery.
Colonel	Clubley, J. K.	2nd Madras Infantry.
Captain	Coats, G. H. B.	D. S. Officer, Bundelkund.
Major	Cole, H. H.	R. E.
Maj.-Gl. C.I.E.	Collen, E. H. H.	Secretary to Government.
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Colonel	Collis, F. W.	21st Punjab Infantry.
*Colonel	Cologan, J. F. Fitz G.	33rd Bengal Infantry.
Lieutenant	Colomb, R. P.	3rd Battn. 4th Bo. Rifles.
His Excy.	C.-in-C. in India	
His Excy.	C.-in-C. Madras Army	
H. R. H.	C.-in-C. Bombay Army	
Br. Genl. C. B.	Combe, Boyce, A.	Commanding Sind Dist.
Rt. Hon'ble Lord G.C.I.E.	Connemara	Governor of Madras.
Lt.-Colonel	Connolly, E. R.	B. S. C.
Ditto	Cook, J.	36th Sikhs.
Captain	Cook, W.	Comt., Mily. Police, Burma.
Major	Cooper, H.	Loyal North Lancashire.

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Rank.	Name.	Corps.
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Captain ...	Craster, J. C. B. ...	12th Bengal Infantry.
Major, V.C...	Creagh, O' M.	Mhairwara Battalion.
Lieutenant	Craufurd, J. A. H. ...	7th Bombay Infantry.
Captain ...	Cunliffe, E. W. ...	6th Punjab Infantry.
Surgn.-Maj.	Cunningham, D. D. ...	I.M.S. Professor, Medl. College, Calcutta.
Colonel ...	Cunningham, E. ...	D. S. Officer, Bombay.
Major ...	Custis, J. G. C. ...	Oxford Light Infantry.
Lt.-Colonel	Davidson, J.	3rd Punjab Cavalry.
Major ...	Davidson, J.	8th Hussars.
Captain ...	Davies, O. E. M. ...	D. S. Officer, Fort William.
Surgn.-Maj.	Davies, R. W.... ...	Medical Staff.
Captain ...	Davison, K. S... ...	4th Bengal Cavalry.
Major ...	Deane, G. W.	(D.C.O.) 13th B. Lancers.
Lt.-Colonel	Deane, T.	Depy. Secy. Mily. Dept.
Capt. C.I.E., C.M.G.	DeLaessœ, A. F. ...	Asst. Commr. Merwara.
Lt.-Colonel	Deshon, C. J.	Royal Artillery.
Major ...	Des Voeux, C. H. ...	4th Bengal Infantry.
Lieutenant	Dick, A. R.	2nd Punjab Cavalry.
Lieutenant	Dobbie, H. H.... ...	30th Punjab Infy.
Colonel ...	Dodd, C. A.	B. S. C.
Lt.-Colonel.	Dodsworth, W. F. ...	Cant. Magt., Dinapore.
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Major ...	Duke, J. C.	Duke of Wellingtons W. R.
Captain ...	DuMoulin, ...	Royal Sussex.
Captain ...	Dun, E. W.	Depy. Asst. Qr Mr. Genl.
Captain ...	Dunsterville, K. S. ...	R. A., Ordnance Dept.
Captain ...	Durand, A. G. A. ...	1st Regiment C. I. H.
*Major C. B.	Durand, E. L.	B. S. C.
Sir K.C.I.E. C. S. I.,	Durand, H. M. ...	Secy. to the Govt., Foreign Department.
Major ...	Dyce, G. H. C... ...	21st Punjab Infantry.
M.-Genl.C.B.	East, C. J., ...	Comdg. Bangalore Dist.
Lieutenant.	Egerton, R. G.... ...	Corps of Guide (Q. O.)
Lt.-Colonel	Elles, E. R.	Royal Artillery.
Major-Genl. C.B., A.D.C.	Elles, W. K.	Adjt. General in India.

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Rank.	Name.	Corps.
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*Honb'le K.C.S.I., C.I.E.	Elliott, Sir C. A. ...	... ...
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Captain ...	Ensor, J. H.	Adjt, Bangalore Volunteers.
Colonel ...	Evans, H. M.	43rd G. L. I.
Surg.-Major M. D.	Evatt, G. J. H... ...	Medical Staff.
Lieutenant	Evatt, J. T.	2-3rd Gurkhas.
Colonel ...	Eyre, E. H.	1st Madras Pioneers.
Major ...	Eyre, V. G. L.... ...	34th Pioneers.
Lieutenant	Fagan, H. H. F. ...	10th Bengal Lancers.
Captain ...	Faithfull, H. T. ...	19th Punjab Infantry.
Esquire ...	Fanshawe, H. C. ...	C. S.
Captain ...	Fasken, E. J. N. ...	3rd Sikh Infantry.
Br.-General.	Faunce, F.	Madras Staff Corps.
Major ...	Fenton, A. B.	4th Madras Cavalry.
Major ...	Ferrier, A. W.... ...	P-1 Royal Artillery.
Captain ...	Field, W. C. F... ...	Asst. Acct. General, M.D.
Surgeon ...	Firth, R. H.	Medical Staff.
Colonel ...	Fitzgerald, A.	General List Infantry.
Colonel, C.B.	Fitzgerald, C. J. O. ...	3rd Cav.(Hyderabad Contg).
Bde.-Surgn. M.D.	Fleming, J. Mac N. ...	26th Punjab Infantry.
Captain ...	Forbes, E. E.	2nd Madras Lancers.
Lt.-Colonel	Ford, H. I. E... ...	Royal Artillery.
Captain ...	Foss, K. M.	Asst. Commissary General.
Captain ...	Freeman, B. L... ...	2nd Punjab Vol. Rifles.
H.E.Rr. Adl. K.C.B., C.M.G.	Fremantle, Hon. Sir E.R.	Naval C.-in-C., East India Station.
Captain ...	Fullerton, J. D. ...	R. E., Bo. Sap. and Miners.
Colonel, C.B.	Galloway, J.	29th Bombay Infantry.
Major ...	Garrett, A. J.	1st Infantry, Hyd. Contg.
Captain ...	Gartside Tipping, R. F..	D. S. O., P. F. F.
Lt.-Col. ...	Gaselee, A.	2-5th Gurkhas.
Col., D. S. O.	Gatacre, W. F. ...	D. Q. M. G.
Colonel ...	Gibbs, G. R.	B. S. C.
Captain ...	Gibbs, M. I.	31st Punjab Infantry.
Major ...	Gilchrist, R. A. ...	M. S. to Resdt. Hyderabad.
Major ...	Glancy, J. G.	Leinster Regiment.
Lt.-Col. ...	Glen, A.	2nd Lincoln Regiment.
Captain ...	Glennie, E.	R. E.

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Rank.	Name.	Corps.
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Lt.-Col. ...	Godfrey, G.	2nd Madras Infantry.
Lieutenant	Godfrey, S. H. ...	Asst. Pol. Agent Palanpur.
Lt.-Col. ...	Goldie, B. J.	R. E.
Major ...	Gordon, A. E.	B. S. C.
Captain ...	Gordon, J. C. F. ...	6th Bengal Cavalry.
Major ...	Gordon, S. V.	23rd Pioneers.
Lieutenant	Gordon, W. R. P. ...	2nd P. V. R. Corps.
Lt.-Genl. ...	Gott, W. C.	Retired List.
*Lt.-Col. ...	Gowan, W. E.	38th Bengal Infantry.
Major ..	Grant, S.	R. E.
Major ...	Graves, B. C.	4th Bengal Infantry.
*Major ...	Graves, S. H. P. ...	26th Punjab Infantry.
Captain ..	Gray, W. du G. ...	4th Punjab Infantry.
Maj-Genl. K.C.B., K.C.M.G.	Greaves, Sir Geo. ...	Comdg. Meerut District.
Lt.-Col. ...	Greig P. H.	7th Bombay Infantry.
Col., C.S.I....	Grey, L. J. H.... ...	Commr. & Supdt. Delhi Dn.
Surg.-Major	Gubbins, W. L. ...	Medical Service.
Colonel ...	Hadow, F. E.	Royal Artillery.
Lt.-Col. ...	Hailes, W.	4th Bengal Infantry.
Major ...	Halkett, H. Craigie ...	32nd Pioneers.
Lt.-Col. ...	Hall, A. C. B.	1st Loyal N. Lancashire.
Esquire ...	Hallen, J. H. B. ...	Veterinary Dept.
Colonel ...	Hallowes, H. J. ...	D. S. O. Mhow.
Col., D. S. O.	Haly, R. H. O'Grady ...	Suffolk Regt.
Captain ...	Hamilton, W. G. ...	E. Lancashire.
Colonel ...	Hamilton, A. F. ...	R.E., Queen's Own Sappers and Miners.
*Colonel ...	Hanna, H. B.	Retired List.
Lt.-Col. ...	Harene, C. E.	4th Bengal Cavalry.
Lt.-Col. ...	Hargrave, H. J. B. ...	B. B. & C. I. R. V.
Captain ...	Harris, C. W.	4th Bengal Infantry.
Esquire ...	Hart, G. H. R. ...	Bombay Accts. Dept.
Major ...	Hart, H. H.	R. E.
Col., V.C. ...	Hart, R. C.	R. E.
Lt.-Col. ..	Harvey, C. L.	2nd Wiltshire Regiment.
Colonel ...	Hastings, F. E. ...	2nd Sikh Infantry.
Captain ...	Haughton, J.	35th Sikhs.
Lt-Col.D.S.O.	Hawes, A. J. D. ...	4th Punjab Infantry.
Captain ...	Hayden, F. A. ...	West Riding Regiment.

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Rank.	Name.	Corps.
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Captain ...	Henderson, P. E. ...	Assistant Commr,, Assam.
Colonel, C.B.	Hennessy, G. R. ...	15th Sikhs.
Captain ...	Herbert, C.	Assistant Commr., Ajmere.
Major ...	Hervey, H. de La M. ...	1st Punjab Cavalry.
Major ...	Hewat, H. R. C. ...	Royal Scots Fusiliers.
Capt. C. I. E., A. D. C.	Hext, J.	R. N.
Colonel ...	Higginson, T.	1st Punjab Infantry.
Lt -Colonel	Hill, R. H. T.	A. C. G. Madras.
Major ...	Hill, W.	1-2nd Gurkhas.
Major ...	Hobday, T. F.... ...	Offg. C. G., Eastern Circle.
*Br-Gl. C.B.	Hogg, A. G. F. ...	Commanding, Aden.
Colonel ...	Hogg, G. C.	4th Bo. Cavy. (Poona Horse.)
Major ...	Hogge, C.	34th Pioneers.
Captain ...	Hogge, J. W.	14th Sikhs.
*Lt.-Col.	Holdich, T. H.... ...	R. E., Survey Department.
Lieutenant	Holland, P.	5th Punjab Infantry.
Colonel ...	Holmes, A. L'E. H. ...	16th Bengal Infantry.
Colonel ...	Holroyd, W. R. M. ...	Dir. of Public Inst., Punjab.
Lt.-Colonel	Home, S. B.	5th Bengal Infantry.
Colonel ...	Horsford, N. M. T. ...	B. S. C.
Lt.-Colonel	Howell, H.	1st Punjab Infantry.
Major ...	Howlett, A.	12th Madras Infantry.
Captain ...	Hudson, H. S... ...	29th Madras Infantry.
Lt.-Colonel	Hume, W. F.	28th Bombay Pioneers.
Major ...	Humfrey, B. G. ...	10th Bombay Infantry.
Major-Genl.	Hunter, A. S.	Mussoorie.
Captain ...	Hutchins, H. L. ...	A. C. General, Madras.
Major ...	Hutchinson, H. D. ...	1-3rd Gurkhas.
Major ...	Hutchinson, J. B. ...	Dy. Comr. Gurdaspur.
Lieutenant	Iggulden, H. A. ...	2nd Derbyshire Regiment.
Colonel ...	Jackson, G. C.... ...	5th Bengal Cavalry.
Lieutenant	Jackson, J.	9th Madras Infantry.
Lieutenant	Jacob, H. F.	14th Bombay Infantry.
*Major ...	James, M.	5th Bombay Cavalry.
Major ...	Jamieson, A. W. ...	7th Bengal Infantry.
Major ...	Jamieson, C. J. ...	14th Sikhs.
Major ...	Jenkins, T. M... ...	Dy. Commissioner, Burma.
Major ...	Jenkins, V.	D. S. Officer, Peshawar.

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* *Life Members.*

Rank.	Name.	Corps.
Colonel	Jennings. R. M.	6th Bengal Cavalry.
Captain	Jones, A. E.	23rd Pioneers.
Major	Jones, W. H. D.	7th Bombay Cavalry.
Br-Genl. C.B.	Keen, F. J.	Comg. Peshawar District.
Capt. D.S.O.	Keene, A.	Royal Artillery.
Major D.S.O.	Keighley, C. M.	Asst. Commy. General.
Major	Keith, J.	Royal Artillery.
Major	Kelly, J. G.	19th Punjab Infantry.
Vet.Surg.	Kemp, W. H.	Army Remount Depôt.
*Lt.-Colonel	King-Harman, M. J.	4th Gurkhas.
Captain	Kitchener, F. W.	2nd West Yorkshire Regt.
Captain	Knox, F. R. B.	2nd Cav., Hyderabad Contg.
Lieutenant	Kreyer, F. A. C.	Bombay S. C.
Colonel C.B.	Lance, F.	Comg. Ferozepore.
*Captain	Lawford, E. E. M.	1st Madras Lancers.
Esqr. C.I.E.	Lawrence, A. J.	C.S., Commissioner, Meerut.
Colonel	Lawrence, W. A.	17th Bengal Cavalry.
Major	Leckie, F. W. V.	20th Bombay Infantry.
Major	Leigh, F.	2nd P. V. Rifle Corps.
Col. C.I.E.	LeMessurier, A.	R. E.
Captain	Lindesay, E.	Loyal N. Lancashire Regt.
Colonel	Lindsay, J. G.	R. E.
Captain	Lister, W. J.	R. E.
*Colonel	Little, H. A.	Comg., Multan.
Major	Lloyd, E.	Garrison Instr. Dalhousie.
Major	Lloyd, T. H.	D. S. O. Poona.
Lt-Col. A.D.C.	Loch, W.	Principal, Mayo College.
Lieutenant	Logan, F. C. L.	1st Loyal N. Lancashire.
Lieutenant	Longley. J. R.	1st East Surrey Regiment.
Major	Lucas, C. A. De. N.	6th Bombay Cavalry.
Br-Genl. C.B.	Luck, G.	I. G. Cavalry.
Colonel C.B., A.D.C.	Luckhardt, W.	Commsy. General Bombay.
Major	Lugard, H. F.	Royal Artillery.
Hon. K.C.S.I. C.I.E.	Lyall Sir James, B.	Lt.-Governor, Punjab.
Lieutenant	Macdonald, J. R. L.	R. E.
Lt.-Colonel.	MacGregor, C. R.	43rd Gurkha Light Infy.
Colonel C.B., A. D.C.	Mackenzie, A. R. D.	B. S. C.
Lieutenant	Mackenzie, R.	R. E.

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* *Life Members.*

Rank.	Name.	Corps.
Br.-General C.B., C I.E....	Maclean, C. S.... ...	B. S. C.
Lt.-Col. C B.	MacNeill, J.G. R. D. ...	D. S. O. Mandalay.
Esquire ...	McCracken, D. E. ...	Thuggee and Dacoity Dept.
Lt.-Colonel.	McNair, A. L.	7th Bombay Cavalry.
Colonel ...	McNeill, D.	Dist. Supdt. Police, Saugar.
Br.-General K.C.B., A.D.C.	Mc.Queen, Sir J. W. ...	Comdg. P. F. Force.
Lt.-Colonel	Magrath, H. M. S. ...	M. S. C.
Captain ...	Maguire, C. M. ...	2nd Cavy. Hyderabad Cont.
Captain ...	Maisey, F. C.	30th Punjab Infantry.
Lt.-Colonel	Maitland, P. J. ...	4th Bombay Cavalry.
Colonel ...	Mallock, H. A. ...	Dir. Genl. of Telegraphs.
Captain ...	Mansel, A.	R. A.
Lieutenant	Markham, C. J. ...	4th K. R. Rifles.
Colonel ...	Marsh F. H B. ...	S. S. O. Naoshera.
Colonel ...	Marshall, H. S. ...	28th Punjab Infantry.
Captain ...	Mason, A. H.	R. E.
Major ...	Massy, C. F.	Supdt. Kapurthala State.
Captain ...	Massy, G.	1st Norfolk.
Captain ...	Masters, A.	1st C. I. Horse.
Captain ...	Maude, F. N.	R. E.
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Lt-Col.C.MG.	Meiklejohn, W. H. ...	20th Punjab Infantry.
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Colonel ...	Merewether, G. L. C. .	R. E.
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Captain ...	Michell, St. John. F. ...	1st Bengal Cavalry.
*Surg.-Maj.	M'Kay, H. K.	I. M. S.
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Lt.-Colonel	Money, E. A.	D. S. O., R. Pindi.
Major ...	Money, E. E.	9th Bengal Cavalry.
Captain ...	Money, G. A.	18th Bengal Lancers.
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[illegible]	Keen, F. J. ...	Comg. Peshawar District.
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[illegible]	Lance, F. ...	Comg. Ferozepore.
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Major ...	[illegible], F. W. V.	20th Bombay Infantry.
Major ...	[illegible], F. ...	2nd P. V. Rifle Corps.
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Lieutenant	[illegible], J. R. ...	1st East Surrey Regiment.
Major ...	[illegible], C. A. D. N.	6th Bombay Cavalry.
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Major ...	[illegible], H. F. ...	Royal Artillery.
[illegible]	[illegible], Sir J. [illegible] R.	Lt.-Governor [illegible]
C.I.E.		
Lieutenant	M[illegible], J. R. L.	R. E.
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Lieutenant	M[illegible], R. ...	R. E.

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Captain ...	Massy, G.	1st Norfolk.
Captain ...	Masters, A.	1st C. I. Horse.
Captain ...	Maude, F. N.	R. E.
Captain ...	Mayne, R. C. G. ...	29th Bombay Infantry.
Lieutenant	Medley, E. J.	17th Bengal Cavalry.
Lt-Col.C.MG.	Meiklejohn, W. H ...	20th Punjab Infantry.
Colonel ...	Menzies, O.	Ins. Genl. Police, Punjab.
Colonel ...	Merewether, C. G. L. C. .	R. E.
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Colonel ...	Michell, J. W. A. ...	13th Bengal Infantry.
Captain ...	Mitchell, St. John. F. ...	1st Bengal Cavalry.
*Surg.-Maj.	M'Kay, H. K.	I. M. S.
Lt-Colonel	Molloy, E.	2-5th Gurkhas,
Lt.-Colonel	Money, E. A.	D. S. O., R. Pindi.
Major ...	Money, E. E.	9th Bengal Cavalry.
Captain ...	Money, G. A.	18th Bengal Lancers.
Major ...	Montgomery, J. A. L....	Deputy Commr. Sialkot.
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Major ...	Wace, R. ...	R. A.
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*Captain ...	Williams, G. ...	R. E.

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Lt.-Col.	Wilmer, J. R.	Survey Department.
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Colonel	Wilmot, R. Eardley,	D. S. Officer.
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*Captain	Yate, A. C.	29th Bombay Infantry.
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Major-Genl. V C., K.C.B.	White, Sir G.	Comdg. Quetta District.
Captain	Chambers, O. A.	Royal Warwickshire Regt.
Major	Ward, A. E.	B. S. C.
Captain	Hume, V. C.	Royal Artillery.
Surg.-Major	Beatson, C. H.	I. M. S.
Esquire	Robertson, F. A.	Civil Service.
Colonel	Rogers, G. W. N.	2nd Bn. Royal Irish Regt.
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Colonel	Sanderson, H. B.	Judge Advocate General.
Lt.-Colonel	Kinsman, H. J.	Royal Artillery.
Captain	Forde, L.	A/1 Royal Artillery.
Lieutenant	Nathan, M.	R. E.
Captain	Bradshaw, L. J. E.	35th Sikhs.
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Colonel	Barton, G.	Royal Fusiliers.
Captain	Beatson, W. J. A.	P/4 Royal Artillery.
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Lieutenant	Forbes, L. A.	2-3rd Gurkhas.

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Capt. F. P. L. White.

6th Bengal Cavalry, Loralai,
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Lieut.-Col. H. A. Fletcher.
Capt. J. C. F. Gordon, Asst. Supdt., Reserve Depot, Saharanpore.

7th Bengal Cavalry, Allahabad,
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8th Bengal Cavalry, Lucknow,
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Lieut. W. M. Carpendale.
Col. H. Chapman,

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Lieut. H. Fagan.

11th Bengal Lancers, Nowgong,
Col. A. H. Prinsep.
Capt. F. H. R. Drummond,
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13th Bengal Lancers, Bareilly,
Capt. G. W. Deane.

14th Bengal Lancers, Sialkot,
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Major J. P. C. Neville.

15th Bengal Cavalry, Rawal Pindi,
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Lieut.-Col. M. H. Court, Mussoorie.
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Lieut.-Col. A. W. R. Becher
(Mily. Secy. H. R. H., C.-in-C., Bom.) Poona.
Capt. V. M. Stockley.

17th Bengal Cavalry, Ferozepore,
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Lieut. E. B. Burton, Furlo.
Lieut. E. J. Medley, Furlo.

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7th Bengal Infantry, Fort William,
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12th Kelat-i-Ghilzai Regiment, Field Service, Burmah,
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20th Punjab Infantry, Rawal Pindi,
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22nd Punjab Infantry, Ferozepore,
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23rd Pioneers, Umballa,
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Capt. A. E. Jones.

24th Punjab Infantry, Sialkot
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25th Punjab Infantry
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2nd Bn., 2nd Goorkhas, Dehra Doon,
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2nd Punjab Cavalry, Edwardesabad,
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(Weekly),
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Journal,
Asiatic Society of Bengal,
57, Park Street,
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St. Petersburg,
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"Memorial D'Artilleria,"
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Illustrated Naval and Military Magazine,
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A SCHEME FOR THE REDUCTION OF GRASS-CUTTERS OF REGIMENTS OF NATIVE IRREGULAR CAVALRY PROCEEDING ON ACTIVE SERVICE BEYOND THE FRONTIER.

By Colonel C. J. O. Fitzgerald, C. B. Commanding 3rd H. C. Cavalry.

A Memorandum from the Adjutant General in India to Officers

Note.—Since writing my lecture on the War Game, which appeared in No. 71 of this Journal the Game has I believe been frequently played at most of the larger stations in this country. I understand that the Games have been often found wearisome from their length, due to the slow progress of infantry compared to that of the mounted arms. I have found the simple plan of the umpire directing the infantry to move during the beginning of the Game at the rate of two moves to one of the other arms, shorten the Game and give it life without injury to the movements of the other arms.

H. B.

ERRATA.

Vol. XVI. No. 70.

Page 11, lines 10 and 11 should read as follows .—

"service, whose tastes and occupations are not those of the "Masher," that peculiar and prominent type of being, the product of modern times."

number of transport animals should be kept and maintained by Regiments in times of peace, which can and should be utilized, to a certain extent, by Government in times of war for carrying a certain amount of rations for Troops, Followers, Horses, and Ponies of the Regiment.

It will be seen as we go on, that by utilizing the Regimental Transport,—numbering altogether 322 ponies,—in carrying 2 full days rations for the Regiment, the saving to the Government Transport Department will be 125 Mules and 41 Muleteers. In other words, if the Regimental Transport is not used in carrying the 2 days full rations for the Regiment, it will be necessary to have 125 Government Transport mules, and 41 Muleteers to carry that amount of rations.

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A SCHEME FOR THE REDUCTION OF GRASS-CUTTERS OF REGIMENTS OF NATIVE IRREGULAR CAVALRY PROCEEDING ON ACTIVE SERVICE BEYOND THE FRONTIER.

By Colonel C. J. O. Fitzgerald, C. B. Commanding 3rd H. C. Cavalry.

A Memorandum from the Adjutant General in India to Officers Commanding Regiments of Native Cavalry has just been issued, ordering certain reductions in baggage animals, and grass-cutters for a campaign.

Before touching on the Government scheme, detailed in that memorandum, I beg to say a few words on the Irregular Cavalry system. The two strong points of the irregular cavalry system, to my mind, are (I) that it makes a Regiment mobile, and more or less independent of the Transport and Commissariat Departments, and (II) that the whole Irregular Cavalry system is founded and built upon the "Joree" system.

If the mobility of an Irregular Cavalry Regiment is in any way affected, the usefulness of the Regiment is in a great degree impaired, but if the "Joree" system is touched, the efficiency of the Regiment is reduced, I consider, to a minimum.

Before commenting on the Government scheme, detailed in the Memorandum now under reference, I beg to state the out-lines of a proposed scheme which does not include Hospital Assistants, or the Hospital departments at all.

Proposed Scheme

By this scheme I propose to reduce the number of syces of an Irregular Cavalry Regiment on its present organization, by 152 *viz* :, from 321½, say 322, to 169½ say 170.

I do not propose to reduce the number of baggage animals, as, I consider, it is very much to the advantage of Government that a large number of transport animals should be kept and maintained by Regiments in times of peace, which can and should be utilized, to a certain extent, by Government in times of war for carrying a certain amount of rations for Troops, Followers, Horses, and Ponies of the Regiment.

It will be seen as we go on, that by utilizing the Regimental Transport,—numbering altogether 322 ponies,—in carrying 2 full days rations for the Regiment, the saving to the Government Transport Department will be 125 Mules and 41 Muleteers. In other words, if the Regimental Transport is not used in carrying the 2 days full rations for the Regiment, it will be necessary to have 125 Government Transport mules, and 41 Muleteers to carry that amount of rations.

Native Officers

Native Officers to be allowed one pony and one syce each, and one tent and one servant between two.

This wlll give the following load for 2 ponies *viz* :—

Weight of Kit.	℔s
Tentage	45
Personal Kit and cooking pots	50
2 Charger's line gear, &c.	40
2 Ponies' gear, &c	20
2 Syce's and one Servant's personal Kit ...	30
Cooking pots for 3 followers	6
	191

Rations for 2 days for above. *Weight of rations.*	℔s
For 2 Officers @ 2 ℔s each ⅌ diem	8
For 2Syces & 1 Servant @ 2 ℔s each ⅌ diem ...	12
For 2 Chargers @ 8 ℔s each ⅌ diem	32
For 2 Ponies @ 4 ℔s each ⅌ diem	16
Total ℔s	68
℔s Grand Total lbs	259

259 ÷ 2 = 129½ ℔ ⅌ pony. This is a light load for a pony.

There are 17 Native Officers, at 1 pony each, equals 17 ponies.

Rank and File

Two ponies between 4 Troopers and one Syce.
One Syce between two Ponies.
4 Troopers & one Syce to a tent.

Weight of Kit.	℔s
Tent for 4 Troopers and one Syce	45.
Personal Kit for 4 Troopers	80.
Personal Kit for 1 Syce	10.
Cooking pots for 4 Troopers and one Syce @ 2 ℔s each	10.
Horse gear for 4 horses @ 15 ℔s each	60.
Pony gear for two ponies	20.
	225.

Rations for two days for above *Weight of rations.*	℔s
4 Troopers and 1 Syce at 2 ℔s each per diem ...	20
4 Horses @ 8 ℔s each per diem	64
2 Ponies @ 4 ℔s each per diem	16
	100
Grand Total	325.
Total ℔s	325

325 lbs. ÷ 2 = 162½ lbs per pony.
Strength of rank and file 609.
609 ÷ 2 = 304½ ponies, say 305 ponies.

Proposed Scheme.

	Ponies
Total Native Officers ponies	17
Total Rank and File ponies	305
Total ponies	322
Total Native Officers' Syces	17
Total Rank and File Syces	152½
Total Syces	169½
Say 170 Syces	

By this scheme not only is the "Joree" system maintained in its integrity, with the one slight difference of having one syce to two ponies instead of to one pony, which turns it simply into a double "joree," but the Regimental Transport Establishment of 322 ponies which is entirely maintained and kept up at the expense of the Regiment, carries not only all personal Kit, horse and pony gear, and tentage of the Regiment, but does Government Transport work to the extent of carrying 2 days full rations for Troops, Followers, Horses and ponies.

Let us now calculate what the saving to Government will be by utilising the Regimental Transport in carrying two days rations instead of having it carried by Government Transport mules.

SAVING EFFECTED TO GOVERNMENT TRANSPORT DEPARTMENT.

Rations for 2 days for.	lbs
17 Native Officers and 17 Syce @ 2 lbs per diem for 2 days	136.
8 Native Officers' Servants 2 lbs per diem for 2 days	32.
17 Native Officers' Horses @ 8 lbs Do Do	272.
17 Native Officers' Ponies @ 4 lbs Do Do	136.
Total lbs	576.

Rations for 2 days for.	
609 Rank and File @ 2 lbs per diem for 2 days	2,436.
153 Syces @ lbs per diem for 2 days	612.
609 Horses @ 8 lbs per diem for 2 days ...	9,744.
305 Ponies @ 4 lbs- per diem for 2 days... ...	2,440.
Total lbs,	15,232.
Grand Total lbs,	15,808.

lbs. lbs.
15,808 ÷ 150 = 105 Mules load, and 58 lbs. over.
150 lbs. is considered a full mule load.

The total weight of rations for Troops, Followers, Horses, and Ponies for 2 days comes to 15,808 lbs..

At the calculation that a mule will carry 150 lbs., besides the weight of a Government Transport saddle, it will require 105 mules, (58 lbs. over) to carry the above weight of rations.

For 150 Mules, 35 Muleteers are necessary viz: 1 Muleteer per 3 mules. To carry rations for these 105 Mules, and 35 Muleteers, the following carriage will be necessary.

Rations for 2 days for.	lbs.
105 Mules @ 4 lbs. per diem each, for 2 days ...	840.
35 Muleteers @ 2 lbs. per diem each for 2 days ...	140.
Add ...	58.Over
Total lbs.	1038.

1038÷150–7 Mules load (about.)

To carry the rations for 2 days for 105 Mules and 35 Muleteers requires 7 Mules and 2 Muleteers,

The undermentioned extra carriage will be required (1) to carry the rations for the above 7 Mules and 2 Muleteers, (2) and also to carry the personal Kit and cooking pots of 37 Muleteers and the mule gear of 112 Mules.

Rations for 2 days for.	lbs.
7 Mules @ 4 lbs. per diem each, for 2 days ...	28.
2 Muleteers @ 2 lbs. per diem each, for 2 days ...	8.
Total lbs.	36.
Personal Kit	
37 Muleteers personal Kit @ 10 lbs. each	370.
37 Muleteers cooking pots @ 2 lbs. each	74.
Total lbs.	444.
Mule Gear for 112 Mules at 10 lbs. per mule ...	1,120.
Total lbs. ...	1,600

1,600÷112=10 mules load, (and100 lbs. over) say 11 mules load.

These 11 Mules will require 3 muleteers, for all of whom rations will have to be carried.

Personal Kit and Rations for 2 days for.	lbs.
3 Muleteers at 2 lbs per man	12
3 Do Kit and cooking pots at 12 lbs. ₽ man	36
11 Mules at 4 lbs per mule	88
Mule Gear for 11 mules at 10 lbs.	110
Total lbs	246

246÷15=Say 2 mules load, including rations for the 2 mules.

These 2 mules with the above 11 mules, makes a total of 13 mules for which 4 muleteers will be required. Three muleteers are already included in the above calculation, and one extra muleteer is all that is required

Abstract.

Showing the member of mules and muleteers that are required to carry 2 days full rations for an Irregular Cavalry Regiment.

Totals	*Mules*	*Muleteers.*
„ ...	... 105 ...	... 35
„ ...	... 7 ...	... 2
„ ...	... 13 ...	... 4
Grand total ...	... 125 ...	... 41

It requires 125 mules and 41 muleteers to carry 2 days rations for an Irregular Cavalry Regiment. By the proposed scheme all this is carried on the Regimental Transport ponies, and Government are thereby saved (I) the sum required for the purchase of these 125 mules with saddles, and gear, and (II) keeping up and maintaining 41 muleteers and 125 mules. This large Establishment will have to be kept up by Government, not only in times of peace, but also in times of war, if they intend Cavalry Regiments to be mobile, and the Transport Department to be efficient.

I will now touch upon and compare the two schemes, the Government scheme, and the proposed scheme.

COMPARISON OF THE TWO SCHEMES.

I. By the Government scheme there is one pony and one Syce between 2 Native Officers. If one Native Officer is detached from the Regiment on duty, which continually occurs, I do not see how things could be arranged properly having full regard to efficiency and mobility.

(*a*) By the proposed scheme I give every Native Officer, one Pony and one Syce, and also one Servant between two Native Officers.

I consider it is absolutely necessary that every Native Officer should be quite independent as far as his Pony and Syce is concerned. Should a Native Officer be sent on detached duty, he could easily arrange, by the proposed scheme, for a tent and also for a Servant. As on Service the duties of a Native Officer will employ him more or less all day, a servant is, I consider, a necessity to cook his food for him &c. If Government do not show some little consideration to their native Officers, they cannot expect native noblemen and gentlemen to enter the service.

Several years ago I advocated the Establishment of a Sandhurst in India, for the training of the sons of our native Officers who belong to the fighting races of India, and also for the sons of native noblemen and gentlemen whose forefathers, from time immemorial, have lived and died by the sword. I remark with much pleasure that His Royal Highness The Duke of Connaught has lost no time in noticing one of the weak points in our Military organization, and has I understand, recommended that our young native Officers should be trained, some what similarly to our British Officers.

Rank and File Government Scheme.

II. By the Government scheme there is

(*a*) One Pony between 3 men.

(*b*) Six men to one tent.

(*c*) There is one syce for every three men, and one pony but the syce's tentage and personal kit is carried *separately* from that of his Master, the trooper, and is *not* carried on the pony he has charge of, but on some other pony!

Now let us take all these three points seriatim, and see how they effect the Irregular Cavalry system.

(*a*) By having one pony between 3 men, the backbone of the Irregular Cavalry system is done away with, *viz*: the "joree" system. All Irregular Cavalry Officers will know what I mean. For many and obvious reasons I think the system of one pony between 3 men is unworkable. The "joree" has always been considered the unit, and, I say, should remain the unit.

(*b*) The new Government scheme is "six men to one tent." I do not think it is possible for six Troopers, with their six kits, and their six saddles, &c. to get into one tent of 45 lbs. In wet weather it would be absolutely necessary for the saddlery to be under cover.

(*c*) The new Government scheme is one syce and one pony between 3 men. The tentage, and personal kits of the troopers and horse and pony gears, are carried on this pony, but the syce, who must of necessity remain with this pony, his kit and tentage is carried on one of the extra 19 ponies provided for grass cutters. This to my mind is perfectly impracticable. Picture to yourself the unutterable confusion that must occur on the march of a Regiment in the early morning. Syces leaving their own ponies, and running about in the dark trying to find the grass cutter's pony on which their Kits should be loaded. Again, try and picture to yourself the state of affairs on the arrival of the baggage at the new encamping ground. Syces hunting for their kits, which are not to be found, and which perhaps were left behind at the last encamping ground, or dropped on the march. It is, I consider, absolutely necessary that a syce should have his kit on the pony or ponies that he is in charge of, and directly responsible for.

(1) Tentage at 3 lbs per syce is allowed. Who are to provide and maintain these tents, where are they to be pitched in camp, and what kind of tents are they to be? If they are to be the same kind of tent as the troopers', then 15 syces, and 15 pony saddles and gears, must get into one tent, but this is not possible.

(2) I maintain that any system by which the syces personal kit, tentage &c. is to be detached from him, and to be carried by any other pony than the one that he is looking after, and which belongs to his "Joree" is unworkable.

(3) Supposing a small Guard, say of 1 Duffadar and 6 Lances, are to be detached from the Regiment for some duty or other, how are the syce's kits, &c. and tentage to be carried?

Many more questions similar to this suggest themselves to my mind, but the above, I think, are sufficient to prove the impracticability of the scheme.

(III) The personal kit at 10 lbs per syce, for the 9 Native Officers' syces in the Government scheme, appears to me to have been twice calculated, once in the weight to be carried by the Native Officers, ponies, and a second time in the weight to be carried by the grass-cutters' ponies?

Proposed Scheme.

(IV) By the proposed scheme an Iregular Cavalry Regiment will maintain at all times a Regimental Transport Establishment of

	17	Native Officers' Ponies.
	305	Rank and File Ponies.
Total	322	Ponies.
	17	Native Officers' Syces.
	153	Rank and File Syces.
Total	170	Syces.

(The 8 Native Officer's Servants I look on as private servants).

By this scheme I reduce the number of syces on the present system, from 322 to 170, *viz.* by 152 syces, but I retain,—as on the present system,—a Regimental Transport Establishment of 322 ponies, whose services are entirely at the disposal of Government, in carrying all the troops and follower's, personal kits, cooking pots, horse and pony gear, and also two days full rations for the whole Regiment.

The proposed scheme is exactly the same as the present system now obtaining in all Irregular Cavalry Regiments, except that I propose to have one syce between two ponies, and not one syce to each pony. The proposed Scheme does not interfere with the "Joree" system.

One syce can, I consider, very easily look after 2 ponies, and their loads, always supposing that the ponies are geldings, as has been ordered by Government.

By the proposed scheme the Regimental Transport Establishment of 322 ponies, not only carries the personal kits and cooking pots of troops and followers, and horse and pony gear, but carries two days rations for the whole Regiment weighing lbs 15,808. If this weight of rations was carried by the Government Transport Department it would require.

41 Muleteers and.
125 Mules.

By the proposed scheme, Government is saved the very large expense of purchasing 125 mules with saddles and gear, and keeping and maintaining them and 41 muleteers.

If every Irregular Cavalry Regiment is prepared to maintain 322 transport animals, on some scheme, such as the proposed scheme, I cannot see the wisdom in wishing to reduce the transport, or carrying power, of a Regiment. The wisest policy appears to me to be,—having reduced the weight of personal kits of Troops and followers as far as possible,—to reduce the number of your followers, having due regard to efficiency and mobility, but not to reduce your *carrying* power, *viz* your Transport animals.

By the proposed scheme there are 61 Syces less than by the Government scheme. As by the Government scheme there is no allowance made for the carriage of 2 days rations for the whole Regiment, which would employ 41 muleteers and 125 mules to carry, to make a fair and equal comparison between the two schemes, it would, I consider, be necessary to add the above number of Muleteers and Mules to the number of Syces and ponies as required by the Government scheme.

Government Scheme.

Ponies 231 plus 125 Mules = 356.
Syces 212 plus 41 Muleteers = 253.

This makes a total of 34 ponies and 83 Syces *more* than the proposed scheme

(V). As by the proposed scheme, the number of Syces is reduced to about the lowest number an Irregular Cavalry Regiment can well work with on service with efficiency, I consider

(*1st*). That 2 spare Syces per Troop should be granted in addition.

(*2nd*). That a reserve, say of 5 spare Syces per Troop, should, be kept at the Depôt, to fill up all casualties caused by sickness death, &c., The spare Syces could be employed at the Depôt on Regimental duty, in looking after Remounts &c. &c.

(VI). I have framed the proposed scheme for the reduction in the number of Syces, as I understand that Government have made up their minds, and I consider very rightly, to reduce the number of followers with Troops in the field.

With the exception of Bheestees, (Puckalies) and a certain number of Troop Cooks, I consider, that *all* the other followers, who usually accompany Troops in India, should be done away with on Service beyond the frontier.

The Irregular Cavalry syce, who to all intents and purposes is the Trooper's private servant, and paid by him, is in reality a servant of Government, although not paid by Government, (enhanced pay excepted) and is perhaps the most useful and paying servant Government has. In the Burma Campaign of 1886-87, the Syces attached to my Regiment, not only provided grass for all the horses and ponies of the Regiment, but acted as a second Transport Department, and carried on the Regimental ponies in all expeditions and marches 3, and very often 4 days full rations. Except on 2 occasions, when nearly all the syces of 2 detachments were prostrated with fever, during the whole of the Burma Campaign, my Regiment has not drawn a blade of grass from the Commissariat. When it is taken into consideration that compensation at the rate of 4 annas per diem for every Government transport animal is allowed, the very large sum saved to Government, on all the horses and ponies of my Regiment, by our not indenting on the Commissariat for grass, can be calculated.

VII. I must apologize for the very imperfect manner in which I have laid this my proposed scheme before the reader, but my duties in Burma especially at the present time, as my Regiment will shortly be embarking for India, have left me very little time to devote to the task, and the interruptions I have had, have been innumerable.

A PLEA FOR THE ADOPTION OF THE COMPANY AS THE BEST UNIT OF COMMAND IN INSTRUCTION AND TRAINING AND SUPERVISION IN QUARTERS.*

By Lieut.-Colonel W. E. Gowan, *38th Bengal Infantry.*

Amongst the prominent wants and blots in the present organisation of native infantry regiments, the insufficiency of British officers and the recognised shortcomings (from a military point of view and speaking generally) of representatives of the native commissioned and non-commissioned grades are, I think, generally admitted.

The requirements of modern warfare and of military training of the present day have placed no light burden, and no small amount of responsibility, on those to whom has been entrusted the task of preparing our native soldiers to take their share in wars with foes in every respect superior to those whom they have learnt under our guidance to face so successfully, and to wage campaigns in which breech-loading rifles, long range artillery, machine guns and other deadly implements and appliances for the destruction of human life, are employed on a scale that is ill-suited to the ranks of a Power which finds it difficult to preserve its military forces even on a *peace* footing of both officers and men.

If, then, the task of training soldiers to the required pitch of perfection is found to be arduous in the case of a British company officer dealing with a single company of British soldiers, it can be easily conceived that a British wing commander, in a native infantry battalion, *may* find himself barely equal to the strain of fulfilling adequately the same responsibilities in the case of 450 rank and file of another race and language—men to whom the greater part of what has to be communicated is as strange as the "rail gharri," the "bijli tar," and the "agan boat," when seen for the first time.

The only possible chance then of attaining to anything like what the science of modern warfare demands, is to make the locomotive more powerful and to lessen the amount of the dead weight to just that which the engine can easily draw, or, to drop metaphor, reduce the size of the unit, over which the British officer is placed, to just those limits which he, as an ordinary human being with the average amount of intellect and vital energy, can be reasonably expected to competently deal with and thoroughly train, for, in most cases, the wing commander, assisted by his wing officers, does a great deal more than supervise the native company commanders, who, in the majority of instances, have not got beyond the stage of giving the ordinary executive words of command in battalion drill on a level parade ground.

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* This paper was written more than a year ago, but the increased experience gained meanwhile has tended rather to confirm the writer in the views which he has herein put forward. The paper was originally submitted to an officer of rank and experience, and the writer would here acknowledge his obligations to him for his criticisms, whereby he hopes he has profited in some measure at least.

Before, however, any real improvement can be effected in our native infantry battalions it should first, I think, be recognised that we *must* reform the system under which British officers are sent to those battalions.

The most patent want (which a given number of years of peace would no doubt to a certain extent supply) in our native infantry battalions of the present day, seems to centre in a deficiency of men of the useful rank of "Captain," men, that is from eleven to twenty years' service, whose tasks and occupations are not those of the "marker," that peculiar and prominent type of being the product of modern times.

We have, it is true, either old officers who have outlived the system, or want of system, in vogue when they first entered the service, and who, therefore, cannot be expected to display a great amount of enthusiasm over that which they possibly do not themselves thoroughly grasp; but we have also a great preponderance of very young officers, whose youth precludes the possession of well-balanced minds, or who, in other words, are lacking in both knowledge and experience of the native soldier.

In saying this, I have not the very slightest desire to either assert or imply that many of the young officers, of whom British regiments are now deprived to feed the native army, are not thoroughly of the right sort, for I am quite conscious of the fact that, during the recent Guerilla warfare and hardships in Burmah, young officers, many of them straight from British regiments, or, at least, with but a few days' or weeks' service with native regiments, have done right well. The object, however, of this paper is to point to the machinery now in use for working of the native material so as to raise it to the high standard of excellence that *must* be exacted if we ever contemplate our native army being fit to cope with any and every possible emergency.

In the face, therefore, of the striking disproportion in the ranks of our native infantry battalions of officers of the useful rank of "Captain," and in the preponderance therein of officers of very junior standing, who have not themselves had the training which would best fit them for service with native soldiers, the problem put before a commandant of such a battalion—that of insuring that the various branches of knowledge, which it is supposed can be brought in a brief period within the grasp of ignorant men, *are* placed more than skin deep—is one of almost impossible solution with the very few suitable instruments at his command.

If such is the case in a state of preparation for war, it surely behoves us to at least begin to lay the solid foundation of some stable organisation that will enable us to meet any possible foe with some reasonable hopes of success, remembering that the same observation applies to field training as has been well applied in the following words to discipline:—

"Do what you will, war discipline* must fall several degrees lower than peace discipline*; it is, therefore, necessary in peace to make the standard of discipline* several degrees higher than is requisite for war."

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* For "discipline" in the first line substitute the word "results"; in the second and third lines the word "training," and the application seems apposite.

Now with the present system of promotion from the ranks, we cannot look to our native officers for real aid in the work of raising the military standard of the rank and file, and if for no other reason, because the native officer, so far from himself rising in an intellectual sense with his military advancement, is too often allowed to fall several degrees below any standard of excellence to which he may have attained when a non-commissioned officer.

To put the matter briefly and in a homely way. The native officer is not required to pass any examination before he becomes a 'jemadar,[*] nor any further and more stringent test before advancement to the grade of subadar. He knows, too, that by seniority and as his years and the girth of his stomach increase, so will the hoards, which lie buried in his hut, grow larger.

The only course then left open to us, if we wish to train our native infantry battalions up to the demands of modern times, is to make the British element in a native infantry battalion as strong and as efficient as the straitened finances of the empire will admit of.

If, then, by reason of the financial difficulties of the Indian Government, we are unable to maintain the existing sixty-four infantry battalions, including the infantry battalions of the Punjab Frontier Force, of the Bengal army on a thoroughly efficient footing, it is needless to say that it would be far wiser to place only forty-eight battalions in the first line and to feed those from sixteen depôt battalions of smaller cadres, but capable, if need be, of extension. On this principle therefore the present scheme has been sketched out, and below are given tables showing what, in the weak judgment of the writer of these notes, might tend to place a native infantry battalion on a proper footing according to the requirements of the present day.

The only innovation, apart from the great one, that of recognising that *an ordinary company of* 100 *sepoys is the best measure of one British officer's charge*, and that every British officer (supposing, of course, he be fitted for the responsibility) should have *the same object of interest in a native regiment*, is that of making the post of adjutant and quarter-master one, and of calling the officer holding the dual position by name what the letter of the Army Regulations seem to show he should be, *viz.*, the "confidential staff officer of the commandant."

With British company officers in charge of each company and a proper staff of company instructors, &c., there would be no occasion for permitting any interference in company details, on the part of either an adjutant or a quarter-master, nor any dictation on the part of those junior officers (under the present system) in what is or should be the sole duty of a company's immediate supervisor in respect of every man on the rolls, whether recruit, musician, drummer, bugler or trained soldier. The companies would cease to be filled, as they now are in many cases, with imperfectly trained men. The "staff officer" would be more profitably employed in confining his attention to a general "supervision" (being, it is supposed, an officer of some standing under the proposed organisation) to " the exercise of tact," " to duty rosters," " the inspection of guards," &c , &c., as well as to the performance of such duties as are now dealt with by the quarter-master of a native infantry regiment with the aid of one quarter-master havildar.

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[*] Some regiments have an excellent system of insisting on all jemadars qualifying for the post of native adjutant, the 7th D. C. O. for example.

The company system of training and instruction on the broad principles laid down, either " by authority " or by the commandant of the regiment so empowered, being recognised as the right one, and the admission having been made that *the British company officer is to be solely responsible* to the commander of his half-battalion, and he to the commandant of the regiment for the efficiency of their respective charges, it seems necessary to now point to the provision made under that proposed scheme amongst the non-commissioned grades for a proper staff of assistants to the " British company officer."

Accordingly, the scheme provides for the conversion of two out of the present five havildars, who are attached to each company, into a " company drill havildar " and " company musketry havildar " respectively, leaving the present " pay " and " color " havildars and putting the " staff havildar" of each company in charge of the clothing and equipment of the men, and making him responsible both to the " staff officer " and to the " British company officer " for a good deal of the work which is now thrown upon the overtasked " pay havildar " of a company, work that is not suggested by the particular title that he bears.

These changes, with some concessions in the way of increased pay and good conduct pay to our underpaid sepoys of to-day, constitute the aim and object of these notes.

Were the principle recognised and acted upon, that the only way of working a native infantry regiment up to the requirements of our advanced age is through the medium of the " British company officer " *alone*, we should soon see a considerable step taken towards the desired goal of efficiency, and we should at once cease to witness misplaced efforts in the different regiments to work an ill-constituted machine in various ways—in one corps, through the sole medium of the adjutant, in another through the subadar major, and in a third, perhaps, by bestowing an undue prominence on the native adjutant, and so on, according to the individual idiosyncracy of the particular commandant.

One word more on the subject of recruiting. With the adoption of a system of depôt or feeder battalions, we should get proper recruits into our ranks, whereas it is no uncommon thing, under existing circumstances, to see numerous instances such as the following: A battalion is stationed hundreds of miles away from its recruiting ground ; being in want of recruits the commandant seeks and obtains permission to detach a recruiting party under a native officer. The men of the party, having arrived at their homes, stay there, sending out a man or two occasionally for appearance' sake. After the lapse of several months, and the receipt of sundry letters expressive of the Commanding Officer's disapproval of the recruits sent and the small number who join the regiment, the native officer and his party who have been in effect spinning out an extra furlough, at last receive an order to rejoin head-quarters. Or take another case : Recruits entertained, say, at a station in the North-west are medically inspected and passed as "fit" by the commandant of the nearest regiment. Having been railed down at Government expense, the medical officer of the regiment proceeds to reject, for various "defects," one out of every five; the rest he passes; some go into hospital within a few days of their reaching regimental head-quarters, or at various periods spread over the eight months of recruits' training, and by the end of that time several more have been discharged as unlikely to become efficient or smart soldiers, or, it may be, the receipt of their verification rolls shows that the previous character of at least some was bad.

It is needless to dilate on the loss to which Government is put under such a system of recruiting, more especially when recruits discharged under the conditions first named are provided with railway passes back to their respective homes.

COMPLEMENT OF A NATIVE INFANTRY BATTALION OF THE FIRST LINE.

British Mounted Officers—

	Rank.		*Pay of Rank.*	*Staff Pay.*
I.	Commandant, Lt.-Col. or Major ...		Rs. 827 or 640	Rs. 600
II.	2nd-in-Command and Commander of Right Half Battalion ...		Lieut.-Col. or Major	Consolidated Pay, Rs. 1,032 or 789 (including horse allowance).
III.	Commander of Left Half Battalion ...		Major	Consolidated Pay, Rs. 789 (as above).
IV.	"Staff Officer of Commandant"		Major or Capt.	Consolidated Pay, Rs. 789 or 575, with Rs. 50 a month office allowance.

British Officers on Foot—

			Pay of Rank. Rs.	*Staff Pay.*
V.	* Capt.	in charge of A Company	375	Rs. 200 with contingent allowance of Rs. 25.
VI.	* Lieut.	in charge of B Company	225	do.
VII.	* Lieut.	in charge of C Company	225	do.
VIII.	* Capt.	in charge of D Company	375	do.
IX.	* Capt.	in charge of E Company	375	do.
X.	* Lieut	in charge of F Company	225	do.
XI.	* Lieut	in charge of G Company	225	do.
XII.	* Capt.	in charge of H Company	375	do.

One Medical Officer as at present.

Native Officers—

Eight Subadars (including one Subadar Major), and 8 Jemadars on present rates of Pay and Staff Pay in case of S. M.

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* Tenable on promotion to higher rank in each case, but subject to transfer as vacancies occur in mounted appointments of regiment.

NON-COMMISSIONED OFFICERS (in each Company)—

		Pay. Rs.	*Staff Pay.* Rs.
I.	Drill Havildar	14	2
II.	Musketry do.	14	2
III.	Color do.	14	2
IV.	Pay do.	14	5
V.	Staff do.	14	5
VI.	Drill Naick (in each Company)	12	2
VII. to X.	4 Naicks ditto	12	nil

One of these might be a Lance Havildar and receive extra pay or staff pay of Re. 1 per mensem.

MUSICIANS—

		Pay. Rs.	*Staff Pay.* Rs.
I.	1 Drum Major	8	6
II.	1 Fife Major	8	4
III. to XVIII.	16 Drummers or Buglers	8	—

If in Band an extra allowance from Band Fund of Regiment.

SEPOYS—

900 (100 per Company and 20 L. Naicks, or 10 per half battalion) ...	Pay of recruits, Rs. 7. *Pay when passed into the ranks,* Rs. 8.

GOOD CONDUCT PAY.

						Rs.	
1st Grant after	3 years	*from date of*	*being passed as*	*trained soldier*		1	p. man.
2nd „	6 „	ditto	ditto	ditto		2	do.
3rd „	9 „	ditto	ditto	ditto		3	do.
4th & last „	12 „	ditto	ditto	ditto		4	do.

Honors and Rewards as at present. Kit money as at present.

One seer of atta per diem free in lieu of compensation for dearness of provisions to all ranks *except the commissioned,* whose pay is sufficiently liberal without such addition, and whose position renders it undignified to receive a grant *in formâ pauperis.*

ALPHABETICAL ORDER.

By Major J. G. C. Curtis Oxfordshire Light Infantry.

1. In the days of shock tactics, in order to give solidity to the flanks of the Infantry columns then employed, the tallest men were placed on the flanks of the Company and the smaller men towards the centre. Although the shock tactics of columns were abandoned in our army before the time of the Peninsular war, yet, perhaps for the sake of giving a more symmetrical appearance to the column, when Marching past, the movement of "sizing the Company" still finds a place in the Field Exercise. However the slightest inequality in the surface of the ground puts on end to the symmetry of this arrangement.

2. To prevent confusion, when the company falls in, it is desirable that each man should have his proper place in the ranks.

3. The following considerations seem to indicate that it would be preferable for the men to fall in according to the Alphabetical order of their names that is Andrews on the right Zyetland on the left.

4. In all other situations in the soldiers life except on parade this order prevails.

It is familiar to the soldier from his first pay day.

All rolls and documents are thus made out.

The men are grouped at musketry and on guard by it.

Therefore men who know each other and have at all times worked together would, under fire, be thrown together.

On parade in the dark any particular man could be at once found.

5. Should it be required to detach a section for any duty, if the names of two men were noted (thus Andrews to Charles), by reference to the roll of the company the names of all in that section would be known.

6. Further to preserve this order in quartering men, whether on board ship, in the train, in camp or in billets, would in many ways make the interior work of the regiment easy.

The orderly serjeant would know at all times and in all places where to find any man wanted.

By the order of the men in the ranks agreeing with the order of the roll the issue of pay, clothing or stores, particularly in a restricted space, would be simplified

ACCOUNT OF EXPERIMENTS CARRIED OUT AT THE GUNPOWDER FACTORY, KIRKEE, DURING THE YEAR 1887.

By COLONEL F. J. CALDECOTT R. A.

Now that each of the European nations is doing its utmost to outstrip its neighbours in the manufucture of explosives for war purposes I think it may be of interest to learn what is being done in India in the way of making improvements, and in endeavouring to keep pace with the times, in the manufacture of Gunpowder.

During the past year three series of experiments have been carried on here, *viz*

1st. Experiments in making Cocoa or brown prism powder, which is used at present in the 9·2 inch and 12 inch Breech Loading, and in the 16 inch Muzzle Loading guns.

2nd. Experiments in the manufacture of compressed powders for small arms.

3rd. Experiments with a view to making improvements in the service powders for field artillery.

These series have not any of them been completed, but as some delay will take place before they can be further carried out, I give an account of them as far as they have gone. Their continuation can be subsequently described if the present account is considered to be of any general interest.

Before commencing my description it will be advisable to give an explanation of the names of the service powders which I shall have occasion to mention, and of their uses. "Cocoa" or Prism Brown Powder differs in manufacture from ordinary gunpowder, as will be described hereafter. It is used chiefly for heavy breech loading guns. R. L. G.^{3} (Rifle Large Grain) is used in India for Rifle Muzzle Loading Guns from 25 Pr. to 80 Pr. and for all smooth bored guns.

R. L. G.^{2} a rather smaller grained powder than the last, is used for all Rifled Breech Loading guns up to the 7 inch; for Rifled Muzzle loading guns up to the 64 Pr. (except the 7 Pr.) and in all smooth bore guns.

R. F. G.^{2} (Rifled Fine Grain) is used for the Martini Henry Rifle and for machine guns.

R. F. G. is chiefly used for the Snider Rifle.

Of these Cocoa powder is by far the mildest in its action.

R. L. G.^{3} and R. L. G.^{2} are mild compared with the fine grained powders, the first mentioned being rather the milder of the two.

The two fine grained powders differ little from each other but R. F. G.^{2} is rather the better powder of the two for general purposes.

With this explanation I now proceed to the description of my experiments.

PART I.

EXPERIMENTS IN MAKING "COCOA" OR BROWN PRISM POWDER.

About 18 months ago when in England I was sent to the Royal Gunpowder Factory at Waltham Abbey to study the latest improvements that had taken place of late years in the manufacture of gunpowder for heavy guns.

2. Now the principal improvement that had been lately made was in the manufacture of slow burning powder for the long breech loading heavy guns, whereby a great velocity had been attained for the projectile in conjunction with a mild strain on the gun.

3. To make myself acquainted with the principles on which this powder was made, was the chief object of my visit to the Royal Gunpowder Factory.

4. The secret of making this powder was I believe in the first instance worked out by a German Firm, and, after several unsuccessful attempts to make it in England, the British Government purchased the secret from this foreign firm.

5. On my arrival at Waltham Abbey I was informed that no order had yet been received to instruct me in the manufacture of this powder, and subsequently I learnt that, though the British Government had purchased that secret, yet the Indian Government were considered as as a separate Government, who must make their own bargain with the German firm before one of their officers could be let into the secret. The upshot of this was that the firm asked a sum of £25,000 or thereabouts for their secret, and this the Indian Government declined to pay.

6. This was very annoying as the chief object of my visit was thus unattainable, but during my stay in England I gathered sufficient hints in other Gunpowder Factories to corroborate what I knew before of the principles of the manufacture, and to guide me in the experiments I intended to make on my return to this country, the result of which I give below.

7. Prior to visiting England I had known that this powder, which I will call for convenience by its popular name of "Cocoa" powder, was made differently from ordinary or black powder, in that the ingredients, saltpetre, sulphur and charcoal, which in black powder were mixed in the proportion 79·3 and 18; also that the charcoal was made of straw instead of wood, and prepared in a special manner.

8. For the previous year or 18 months I had been experimenting in the production of charcoals of different strengths, and had found that I could produce charcoal by the ordinary method of burning in iron retorts, varying considerably in their analysis, and consequently in their effects on the powders made from them.

9. It had hitherto been customary to burn charcoal for Cannon-powder at a high heat, which produced what was called black charcoal, containing a high percentage of carbon; while for small arm powders the charcoal was burnt at a lower heat, was called red, and contained a lower percentage of carbon. It was considered as a rule, that the blacker the charcoal the more the carbon, and the milder the powder;

and the redder the charcoal, the less the carbon, and the stronger the powder.

10 In the course of my experiments however I found that the latter rule did not always hold good, and that when the carbon fell below a certain point, the mildness increased as the carbon diminished, also that a greater mildness could be obtained in this direction than with any black charcaal.

11. The results I obtained with the ordinary wood used for gunpowder making here, were that the carbon on the charcoal varied from about 87 to 60 per cent, and that when it stood at about 73 per cent the strongest powder was produced.

12. Finding I could not get below 60 per cent of carbon with the ordinary wood, I tried smaller wood and cocoanut fibre (this was before I knew of straw), but the smallest wood I tried, which was of about the diameter of an ordinary drawing pencil, wonld not give less than 60 per cent of carbon, while the cocoanut fibre took fire in the retorts and I could not make charcoal of it at all.

13. Shortly before the leaving for England, having heard in the meantime that straw was the material used in making the charcoal of cocoa powder, I was thinking by what means I could prevent its burning in the retort, and it occurred to me that it must somehow be kept moving so that none of the particles of straw should remain in contact with the surface of the receptacle, called a slip, in which the charcoal is contained when placed in the retort. I thought this might be done by fitting the interior of the slip with a stirring apparatus which would keep the straw constantly in motion, but before I had time to put this idea into practice I heard of another apparatus in use in the barrack department, which appeared likely to effect the required purpose. This is a small revolving drum, which is placed over a fire, and is used to renovate the charcoal used in the barrack filters. I did not however try this at the time as I was shortly leaving for England where, I thought, I should learn the whole thing, and I was besides busy with matters connected with my approaching departure.

14. On reaching England as before said, I found that I could not obtain any information on the subject at the Royal Gunpowder Factory but I gathered from people connected with the powder trade elsewhere, that the straw charcoal was produced in a revolving cylinder or drum, and that the percentage of carbon (as I had previously supposed) was much lower than anything I had obtained in the ordinary apparatus.

15. On my return to India I tried the barrack department drum, but found that it was not quite suited for the purpose, as it was perforated all round with small holes, and when the straw began to part with its gasses, the flame of the fire communicated with the straw in the drum and burnt it.

16. I then set to work to make a more suitable apparatus, and, after one or two partial failures, I succeeded fairly; the only weak point in it being that I was obliged to content myself with too small a furnace for economy's sake, and this subsequently gave me a good

deal of trouble in keeping up the exact temperature which in the course of my experiments I found necessary.

17. From what I had heard in England, and from my own idea of what was likely to be necessary I considered that the charcoal I had to produce should contain about 52 per cent of carbon and about 5·5 per cent of hydrogen, and this is what I set to work to arrive at.

18. The materials I chose to practice on were a long reed-like grass growing on the banks of the river near the factory, also rice and jowaree straw, the bulk of the primary experiments being with grass as it was easily procurable without payment.

19. A few experiments were required to learn about the heat to be kept up and the length of time required to "cook" the grass properly. This was speedily found out, and within the first dozen attempts the charcoal on analysis was found to give the supposed correct amount of carbon and hydrogen. There was however constant difficulty experienced in keeping up the correct heat owing to the unsuitability of the furnace, and thereby some of the experiments were occasionally spoiled and had to be tried over again.

20. In all, about 50 experiments (not including those spoiled as above) were made, and it was found that the percentage of carbon and hydrogen supposed to be correct could be obtained from grass and jowaree straw, while rice straw gave less carbon.

21. Not however being certain that my ideas regarding the correct percentages were accurate, I then set to work to see what variation I could produce in them, and I found that I could make charcoal with one or other of the above substances, or by mixtures of them, containing carbon varying from 60 to 36 per cent, and hydrogen varying from 6 to 2·5 per cent.

22. During my experiments I had a piece of Brown Prism Powder made by the German firm analysed, and to corroborate this analysis I also tried a piece or two of this powder made at Waltham. The result was that I found my information had been about correct, but my labour in trying to produce charcoals of different characters was not thrown away, as there are now modifications of the Brown Prism or Cocoa powder being made at Waltham Abbey, which will necessitate variations in the preparing of the charcoal.

23. Having now produced a charcoal, which as far as could be judged by analysis, appeared to be about right, the next thing to be done was to see what sort of powder could be made with it.

24. I must now explain that when making Gun powders of any sort, the first test that is applied to it here is what is called "flashing"—

This test takes place as soon as the ingredients of the powder have been thoroughly mixed and ground together, or as it is technically called "incorporated." As soon as incorporation is finished, a small quantity of the powder (about a thimbleful) is placed on a glass plate and fired with a red hot iron rod. Ordinary black gunpowder fired in this way leaves little residue on the plate, the finest descriptions of small arm powders leaving hardly any, while the commonest blasting powder leaves more, but none of them anything like what is produced by cocoa powder. All the black powders also go off with a flash more or less quick according to their quality, while cocoa powder fizzes off like a squib, and the time a certain quantity takes to burn can be accurately measured with a stop watch.

25. The first thing then to be done when making attempts to imitate the cocoa powder was, to incorporate various samples and then to try them against it, and thus obtain the requisite appearance, in the residue left on the flashing plate, as also to ascertain the correct rate of burning, on which latter the main characteristics of the powder depend. This, after three trials, was arrived at, both the pattern powder and the samples having been broken up into dust for comparison. I should mention here that before I succeeded in getting the correct appearance for the residue on the flashing plate I had to treat the charcoal with a chemical. What effect this had on the powder I am not yet certain, but rumour has it that it is necessary, and it certainly made my samples more exactly like the pattern powder as far as flashing was concerned. I have consequently adopted the plan till I have by experiment proved whether I can do without it.

26. The next trial was to press the samples in a hydraulic press so as to make them of the same consistency as the pattern prisms, and then to break both them and the sample prism into grains of the same size, by passing them through sieves, and to see if they behaved similarly when fired.

27. At this part of the experiments an amusing thing happened. It was decided that a small portion of the powder which was about the size of ordinary sporting powder, should be fired out of an old muzzle loading musket which happened to be in my possession, to see how its strength compared with that of similar grain taken from the pattern powder. For this trial a target was made of some thin pieces of deal placed one behind the other. and the gun was loaded with a small measure of powder which roughly contained I should think about 70 grains, the same measure being used for both the sample and the pattern powder.

28. As chance would have it the experimental sample was fired first with the following result. The trigger was pulled and the cap went off but the gun did not. This was rather discouraging but thinking there might be some difficulty in getting the powder to fill the nipple a little ordinary powder was pricked into the nipple and another cap put on. The man who was to fire the gun then put it up to his shoulder and pulled the trigger; again the cap exploded and there was a pause during which he took the gun from his shoulder thinking it was another missfire. As he was lowering it however there was a very slight explosion inside the barrel, a small puff of smoke at the muzzle and the bullet rolled out on to the ground with only sufficient force to go about 6 or 7 yards.

29. For a moment I must say I felt I had utterly failed, and had only made an article which might do for fireworks, but was certainly not gunpowder; however a very slight hope returned almost directly

and I settled not to despair till I had seen what the sample powder would do. Accordingly the gun was again loaded, this time with the pattern powder, and to my great relief exactly the same thing happened with it as with the sample, *viz*; the first shot without priming missed fire, and the second primed with a little ordinary powder pricked into the nipple, hung fire and then rolled the bullet gently along the ground a few yards. Confidence was again restored and the experiments were proceeded with.

30. The Powder broken into grain as above mentioned was then spread on an iron plate and formed into a train a yard long, one half being composed of a sample, and the other of the pattern, that is, 1 foot 6 inches of each. Between the two, in the middle of the train a small heap of ordinary powder was placed as a primer, and another small heap of the same was placed at each end of the train. On the middle heap being fired, the train on either side was intended to burn till it exploded the end heaps, by which the rate of burning could be compared.

31. After three or four trials one of the samples gave the desired result, after which there was no difficulty in producing other samples which did equally well. With a view to future modifications in the manufacture of Cocoa powder further samples were made which burnt both slower and quicker than the pattern.

32. Having got so far it only remained to make the finished powder. To do this in large quantities however would entail expensive machinery, moreover there are no guns in this country to prove this description of powder. In consequence of this I had to content myself with making a small machine for pressing the powder into prisms for use in conjunction with the hydraulic press, and with this I soon turned out a small quantity of prisms, making samples of different strengths for comparison with the pattern prisms. On igniting these sample prisms with a red hot iron they gave satisfactory rates of burning, there being no difficulty in producing samples burning at the same rate as the pattern or in making others to burn quicker or slower.

33. After having got this far I made some more prisms and tried them against the pattern powder in the 9 pr. proof guns. For this purpose I broke each prism into four pieces as I thought this would give a size of grain which would be more suitable to the gun than whole prisms. I made Cartridges weighing 2 lbs 4 oz: each and primed each with a little R. F. G.^{2} powder. The result of this trial was exactly similar to the previous trial in the musket, both the sample and the pattern powder behaving exactly alike, and rolling the proof shot a few yards beyond the muzzle of the gun. Lumps of burning powder were blown out and fell on the ground continuing to burn till they were consumed, leaving a considerable residue on the ground where they fell.

34. There now still remains to prove this powder in a proper proof gun, but as there is not one yet in this country this trial will have to be deferred for the present. The tests however that I have

been able to make shew me that even with the rough appliances I have, I am already so very near the mark, that when called on to make gunpowders of this description a very little practice will enable the factory to turn them out satisfactorily.

PART II.

EXPERIMENT IN THE MANUFACTURE OF COMPRESSED GUNPOWDER FOR SMALL ARMS.

These experiments were taken in hand chiefly with a view to being ready to manufacture a gunpowder for whatever small bore rifle may be adopted into the service and because I had heard accounts of the very high velocity obtained with a compressed powder in the Rubini Rifle, experiments with which are being carried out in England.

2. The first trial I made in this direction was merely to compress some ordinary snider (R. F. G.) Powder in a mould so as to make a pellet which would fit the service Snider cartridge. The object of this was to see what result such treatment would have in ordinary powder on the velocity of the bullet and on the strain on the gun, and thus to obtain some basis from which to form an opinion as to what sort of powder would be necessary to give good results in the form of a pellet. On firing some cartridges with pellets made as above in the Snider Rifle the powder was found to be much too violent, the plug at the base of the bullet being driven in too far with the result that the bullet missed entirely the mark aimed at. Some of the cartridges were fired into bran and the bullets recovered when they were found to be quite knocked out of shape. I saw from this that the bullet of the Snider would quite prevent any great increase in velocity being obtained in that Rifle and that it was probable something milder than the service powders would be necessary in any rifle to obtain good results. I therefore turned my attention to the Martini Henry Rifle, but while waiting for a pellet mould for that arm to be got ready I thought I would give the Snider another trial, not that any practical result would be obtained, but merely for practice. For this trial I made a slow burning powder of a special charcoal with a low percentage of carbon and with this I got very fair results *viz*: an excess over the velocity obtained by the service charge of between 40 and 50 feet per second without undue strain on the cartridge case.

3. After this the experiment was abandoned as far as the Snider was concerned and the Martini Henry Rifle was tried. Now the Martini Henry Cartridge being a bottle shaped one the primary difficulty met with was how to get a sufficiently large pellet into it, and as no means of getting over this was thought of at the time, it was decided to make a pellet as large as would enter the neck of the cartridge and to fill up the vacant space with loose powder. For the first trial service R. F. G. was used.

4. On firing the velocity of the bullet was found to be 1442 feet per second, that obtained with the ordinary service charge of powder being about one hundred feet less.

5. The next trial was with an experimental powder differing considerably from ordinary gun-powder in manufacture. Of this pellets were made as before and the cartridges filled up with loose powder. The velocity on this occasion was 1482 feet per second; At this stage of the experiments a new plan of pressing the powder was thought of, and in the next trial was adopted. This was as follows:—Instead of making a pellet for insertion into the cartridge case the powder was placed loose in the latter and then pressed into a pellet.

6. 100 grains of the powder last tried was thus treated and the velocity obtained was 1520 feet per second.

7. Next a slight variation was made in the manufacture of the powder and on pressing it into the cartridge case it was found that 110 grains could be got in. This quantity was accordingly used, with the result that velocity was obtained of 1594 feet per second.

8. Another trial was now made with service powder pressed similarly; with this the velocity was good being only 31 feet less than that of the experimental powder but the action was much more violent in the cartridge cases, so much so in fact as to render it impossible that such charges could be used.

9. Until further trial has been made it is not certain whether a higher velocity could be obtained in the M. H. Rifle or even whether the velocity above attained (1594 feet) can be attained combined with accuracy of shooting. I think however that something between two and three hundred feet per second can be added to the velocity of the M. H. Rifle combined with accurate shooting which of course means flatter trajectory, greater range and penetration, or, shortly, greater general efficiency for the weapon. What the powder will do in the new small bores remains to be seen as I have no means here of trying. Every thing however points to its doing as much or more in them as in the M. H. Rifle compared with gunpowder of ordinary manufacture.

NOTE—Since writing the above I have obtained the loan, of a small Martini Zeller Express Rifle 360 bore which fires Eleys cartridges with 14 grains of powder and a bullet of 134 grains. To see what I could do with this arm, I extracted the powder from some of the Eleys cartridges and substituted pellets of 18 grains each, made from my experimental powder. On trial for velocity the cartridges as originally filled gave a muzzle velocity of 1013 feet per second while those refilled with the pellets gave a muzzle velocity of 1216 feet per second.

PART. III.

EXPERIMENTS WITH A VIEW TO MAKING IMPROVEMENT IN THE SERVICE POWDERS FOR FIELD ARTILLERY.

These trials, which have not yet been nearly completed, were undertaken with a view to finding out the best method of manufacture in order to produce a powder giving an increased range to field guns. The present powder for these guns is what is called R. L. $G.^2$ and this, in the 9 Pr. Proof gun, has to give a muzzle velocity to the shot of betwen 1380 and 1430 feet per second, while the limit of pressure on the square inch of the chamber is 15 tons. The regulated charge of this powder is 1 lbs 12 oz., while, as the powder is at present made is found to be the largest quantity that can be used without exceeding the limit of pressure. There is also another practical difficulty about increasing the charge, because a greater quantity of powder would entail too large a cartridge bag.

2. It was therefore necessary to make a powder to keep within the limits of pressure, giving a higher velocity to the shot, while not taking up too much room. To attain this end I thought I would make a mild powder, something between ordinary black powder and cocoa powder, which I expected would give an increased velocity without high pressure ; and then to devise some method of making it occupy as little space as possible.

3. Having therefore made a powder of this description. and of a size of grain slightly larger than that of the service R. L. G.[2] I fired it in the 9 pr. Proof gun, with the following results.

With a 1 lbs 12 oz charge, the muzzle velocity was 1316 feet per second, and the pressure per square inch 8·7 tons. Adding 4 oz : to the charge, the muzzle velocity was 1417 feet, and the pressure 10·4 tons. An additional 4 oz, making the charge 2 lbs 4 oz, gave a muzzle velocity of 1466 feet per second, with a pressure of 12·2 tons. From this it appeared that a considerable increase in velocity could be obtained without exceeding the limit of pressure.

4. My idea at this time was, that the chief thing to be aimed at in producing a good powder for field guns, was to make it of a mild nature by means of the charcoal employed in its manufacture but there are other ways of varying the nature of a powder, and I wanted to see what effect some of these would have.

5. I therefore varied the extent to which the powder, was pressed, by which I obtained powder of varying " density," I also dried some samples more than others, and finally I broke them into different sizes of grain. It is unnecessary to describe the proof of all these samples, but it will be sufficient to state that I found alterations in density and moisture made the powder vary in velocity and pressure, and that the velocities and pressures increased or diminished proportionately. Alterations in size of grain however altered the pressures much more than the velocities.

6. Subsequent experiments proved that size of grain was of much more importance in obtaining low pressures combined with high velocities, in the 9 pr gun, than anything else, and I have considerably modified my opinion as to the necessity of a milder powder than what is now used.

7. My next experiment will therefore be to make several samples of powder of large grain, all the same size but varying in their other characteristics. This will give me the powder which, while keeping within the limit of pressure, has the highest velocity.

8. Having settled this point I shall next vary the shape of the grain, and see in what manner I can pack the largest quantity of powder into the space occupied by the regulation cartridge. The best

way to do this will probably be by pressing the powder into suitably shaped pellets and building them up into cartridges after the manner in which prism powders are dealt with. I think there is no doubt that by this method I shall be able to make a cartridge of the regulation size, which while keeping within the limit of pressure, will largely increase velocity and consequently the efficiency of field guns.

P. S. Since writing the above I have seen that the principle of building up cartridges has been proposed in England as a plan likely to improve the efficiency of field and other guns.

THE MOUNTAIN ARTILLERY OF RUSSIA.*

Compiled by Sergeant J. J. Königs, *B. U. L., Librarian, Intelligence Branch, Qr.-Mr.-General's Dept. in India.*

Organization.

Although the Russian mountain artillery is not formed into a distinct body, but is brigaded for the most part with the field artillery, the peculiarities of the *matériel*, as well as the organization of this arm, may be of some interest.

In each of six field artillery brigades two batteries are equipped as mountain batteries.

These brigades are those belonging to the 13th, 19th, 20th, 21st, 38th and 39th Infantry Divisions, all of which except the first belong to the army of the Caucasus.

To these may be added Nos. 3 and 4 Batteries of the East Siberian, Nos. 6 and 7 of the Turkestan Artillery Brigade, and No. 3 Battery of the West Siberian Brigade.

Four mountain guns are also temporarily attached to the first and second batteries of the Eastern Siberian Brigade.

There are also two horse artillery mountain batteries, one West Siberian and the other Turkestan.

These were formed on the 22nd June, 1881, after the pattern of that raised by General Scobeleff, in his campaign against the Tekkes (Geok-Tepe).

The Russian mountain artillery, therefore, consists of—

17 Mountain batteries.
2 Half " "
2 Horse artillery batteries.
A total of 20 batteries with 158 guns.

The West Siberian Horse Mountain Battery consists, in peace, of only two guns; the seven mountain batteries on the peace strength have each 4 guns, and all the others 8 guns, horsed. In war, all except the Turkestan Horse Mountain Battery (see above) have 8 guns.

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The establishment of a mountain battery with pack-animal equipment is :—

TABLE I.

		War.	Peace.
Officers—			
	Battery Commander	1	1
	Senior Officers—Captains or Staff Captains	2	2
	Subalterns—Lieutenants or Sub-Lieutenants	3	3
	Total Officers	6	6
Non-Commissioned Officers and Men—			
(a) Combatants—			
	Battery Sergeant-Major	1	1
	Divisional Sergeants	4	4
	Quarter-Master Sergeants	3	3
	Junior Sergeants	10	8
	Volunteers	1	1
	Trumpeters	3	3
Rank and File.	Bombardier Layers	8	8
	Laboratory Bombardiers	8	8
	Bombardiers	40	14
	Gunners	155	87
	Total Combatants	233	137
(b) Non-Combatants—			
	Clerks (senior and junior)	2	2
	Battery Dressers	1	1
	Junior Veterinary Dresser	1	1
	Dresser Pupil	—	1
	Hospital Orderlies	2	1
	Cutter	1	1
	Artificers	10	6
	Battery Transport Drivers	50	—
	Total Non-Combatants	67	13
	Total Non-Commissioned Officers and Men	300	150
Horses—			
Riding	Officers'	5	5
	Non-Commissioned Officers', &c.	3	3
Pack	Batteries with 3-pr. Bronze Gun	114	22
	or		or
	Batteries with 2·5″ Steel Gun	133	27
Transport		65	6

The following table shows the distribution of duties among the various combatant ranks in a mountain battery with 2·5″ guns :—

TABLE II.

		War.	Peace.	Battery with 3-Pr. Bronze Gun. War.	Battery with 3-Pr. Bronze Gun. Peace.
Battery Sergeant-Major ...	...	1	1		
Quarter Master Sergeants ...	...	3	3		
Sergeants ...	Nos. 1 in charge of subdivisions	8	8		
	In charge of 1st and 2nd Lines of Ammunition Horses	4	4		
	In charge of Transport ...	2	—		
Volunteers	...	1	1		
Trumpeters	...	3	3		
Rank and File	Gun Detachments ...	48	48		
	With 1st Line of Ammunition Horses ...	8	4		
	With 2nd Line of Ammunition Horses ...	8	—		
	With Spare Gun Carriage	1	—		
	DRIVERS.				
	With Gun Horses ...	32	32		
	With Ammunition Horses	64	8		
	With Spare Carriage ...	3	—		
	With Store Horses ...	17	—		
	Spare and Officers' servants	30	25		
	Total all ranks ...	233	137		
Horses—					
Riding ...	Officers	5	5		
	Battery Sergeant-Major ...	1	--		
	Trumpeter	1	1		
	Spare	1	1		
	Total riding ...	8	7		
Pack (Artillery)	Guns	32	16	24	12
	Ammunition Boxes ...	64	8	56	8
	Spare Carriages ...	3	—	2	—
	For 2 Sergeants with 2nd Line of Ammunition ...	2	—	2	—
	Spare *matériel* ...	2	—	17	—
	Artificers' Tools ...	2	—		
	Farriers' Tools and Forge	4	—		
	Spare Shoes and Nails ...	3	—		
	Veterinary Stores ...	1	—		
	Line Gear	3	—		
	Spare Wheels and Shafts	2	—		
	Spare for Guns, &c. ...	13	3	11	2
	Spare for Stores, &c. ...	2	—	2	—
	Total pack ...	133	27	114	22

3

The 6th Battery of the Turkestan Artillery Brigade is equipped with wheeled carriage, and in composition differs slightly from the above. It has 17 Bombardiers and 100 Gunners in peace and war, giving 153 combatant Non-Commissioned Officers and men in peace and 155 in war, and it has only 40 transport drivers in war, making its war strength of Non-Combatants 57 only, and its total strength of Non-Commissioned Officers and men 166 in peace and 212 in war. Its strength in horses is:—

TABLE III.

		War.	Peace.
Riding	Officers	5	5
	N. C. Officers, &c. ...	8	2
Draught (Artillery)		55	45
Transport		8	6

The Draught horses are distributed as follows:—

TABLE IV.

	War.	Peace.
Guns	16	16
Ammunition Carts	24	24
Spare Gun Carriage	2	2
Artillery Stores	6	—
Transport Sergeants	2	—
Spare	5	3
Total ...	55	45

Batteries of the Turkestan Brigade on taking the field are supplied locally with the number of *arabas* or camels considered necessary to transport their baggage, as ordered by the Officer commanding the district.

The peace establishment of the various mountain batteries is shown in the following table:—

TABLE V.

Batteries.	On what Establishment.	Non-Commissioned Officers and Men.		Horses.	No. of Horses.		
		Combatants	Non-Combatants.		Riding.	Artillery.	Transport.
5th & 6th—13th, 5th & 6th—19th, 5th & 6th, 20th & 5th, 21 st, all armed with 3-pr. bronze gun.	Peace	137	13	4 guns and 16 boxes	7	22	6
6th—21st (3-pr. bronze) (Trans-caspia).	War establishment of Combatants, peace of Non-Combatants, increased No. of horses.	283	13	Officers 5, Trumpeter 1 ...	7	...	...
				Spare 1, 8 guns (24), 48 Ammunition boxes (24)	...	48	...
				Spare carriage (2) stores (13) ...	...	15	...
				Spare for guns and stores ...	...	7	...
				Transport	...	...	65
				Total ...	7	70	65
5th—38th (2·5-inch steel gun) ...	Peace, Increased No. of horses.	137	13	Riding, as above	7	...	...
				8 guns (32), 32 boxes (16) ...	...	48	...
				Spare transport	...	5	6
				Total ...	7	53	6

Batteries	On what Establishment.	Non-Commissioned Officers and Men.		Horses.		No. of Horses.		
		Combatants.	Non-Combatants.			Riding.	Artillery.	Transport.
6th, 7th, 8th & 9th–20th (3-pr. bronze)	Peace. Increased No. of horses.	127	13	Riding, as above	..	7	..	—
				8 guns (24), 32 boxes, boxes (16)		—	48	—
				Stores and transport ..	.	...	5	6
				Total	–	7	44	6
8th Turkestan (3-pr. bronze)	Special —	157	13	Special — —	..	7	63	6
2nd Turkestan (2·5-inch steel guns)	War establishment of Combatants, peace of Non-Combatants, increased No. of horses	221	13	Riding, as above ...	..	7	.	—
				8 guns (32), 32 boxes (16)	..	—	48	
				Spare carriages (3), forge (2)	..	—	5	—
				Spare 1 baggage ..	..		6	6
				Total	–	7	59	6
3rd West Siberian (3-pr. bronze)	Ditto — —	200	13	Riding, as above ..	–	7	..	—
				8 guns (24), 48 boxes (24)	–	—	48	
				Spare carriage (2), stores (12)	–	—	13	
				Spare 1 transport	–		8	14
				Total	–	7	70	14

3rd East Siberian ([illegible] inch steel gun).	Peace, with 45 rank and file added and increased No. of horses.	[illegible]	13	Riding, as above	...	7	...	...
				8 guns (32), 64 boxes (32)	...	...	64	...
				Spare carriages (3), forge (2)	...	...	5	...
				Spare and transport ...	...	...	7	14
				Total	...	7	76	14
4th East Siberian (3-pr. bronze) ...	Ditto	182	13	Riding, as above ...	...	7	...	...
				8 guns (32), 64 boxes (32)	...	...	64	...
				Spare carriages (2), forge (2)	...	...	4	...
				Spare and transport ...	...	...	6	14
				Total	...	7	66	14

Batteries	On what Establishment.	NON-COMMISSIONED OFFICERS AND MEN.		Horses.	NO. OF HORSES.		
		Combatants.	Non-Combatants.		Riding.	Artillery.	Transport.
6th—38th, 5th & 6th—39th (3-pr. bronze).	Peace. Increased No. of horses.	137	13	Riding, as above	7	...	...
				8 guns (24), 32 boxes, boxes (16)	...	48	...
				Stores and transport	...	5	6
				Total ...	7	44	6
6th Turkestan (3-pr. bronze) ...	Special	153	13	Special	7	45	6
7th Turkestan (2·5-inch steel gun).	War establishment of Combatants, peace of Non-Combatants, increased No. of horses.	233	13	Riding, as above	7	...	...
				8 guns (32), 32 boxes (16) ...	...	48	...
				Spare carriages (3), forge (2) ...	...	5	...
				Spare 1 baggage	...	6	6
				Total ...	7	59	6
3rd West Siberian (3-pr. bronze)	Ditto	233	13	Riding, as above	7	...	...
				8 guns (24), 48 boxes (24) ...	...	48	...
				Spare carriage (2), stores (13) ...	...	15	...
				Spare 1 transport	...	5	14
				Total ...	7	70	41

3rd East Siberian (2·5-inch steel gun).	Peace, with 45 rank and file added and increased No. of horses.	182	13	Riding, as above ...	...	7	...	...
				8 guns (32), 64 boxes (32)	...	...	64	...
				Spare carriages (3), forge (2)	...	...	5	...
				Spare and transport ...	...	...	7	14
				Total	...	7	76	14
4th East Siberian (3-pr. bronze) ...	Ditto	182	13	Riding, as above ...	...	7	...	...
				8 guns (32), 64 boxes (32)	...	...	64	...
				Spare carriages (2), forge (2)	...	...	4	...
				Spare and transport ...	...	...	6	14
				Total	...	7	66	14

Horse Mountain Artillery.

There are two batteries of this kind of artillery, which is peculiar to Russia, stationed in Turkestan and the Omsk District, and named the Turkestan Horse Mountain Battery and the West Siberian Horse Mountain Battery. The object of these batteries is to be able to keep up with cavalry and act as horse artillery on level ground, and at the same time to be able to cross any difficult mountain passes. Their *matériel* is therefore so constructed that the carriages can either be taken to pieces and carried on the horses or used on their own wheels, in which case the pack-horses not in draught carry the detachments. These batteries are armed with 3-pr. bronze guns.

Their establishments are as follows :—

TABLE VI.

	Turkestan.		West Siberia.	
	War.	Peace.	War.	Peace.
Officers—				
Battery Commander (Colonel or Lieut.-Colonel)	1	1	1	1
Captain or Staff Captain	1	1	3	...
Lieutenant	...	...	...	1
Subalterns (Lieutenants—or Sub-Lieutenants)	3	5	7	2
Total ...	5	5	7	2
Non-Commissioned Officers and Men—				
(*a*) Combatants—				
Battery Sergeant-Major	1	1	1	1
Divisional Sergeants	3	3	8	1
Quarter-Master Sergeants	3	3	...	...
Junior Sergeants	9	7	16	2
Transport Sergeants	2	...	2	...
Trumpeters	3	3	...	...
Rough Rider	1	1	...	...
Rank and File { Bombardier Layers ...	6	6	...	2
Rank and File { Laboratory Bombardiers	6	6	8	2
Rank and File { Bombardiers... ...	16	16	30	6
Rank and File { Gunners	86	86	135	34
Total ...	136	132	204	49
(*b*) Volunteers	1	1	4	...
(*c*) Non-Combatants—				
Clerks	2	2	2	1
Battery Dresser	1	1	1	1
Veterinary Dresser	1	1	2	1
Hospital Orderlies	2	1	2	...
Dresser Pupil	...	1	1	...
Artificers	7	7	15	4
Cutter	1	1	...	...
Battery Transport Drivers	50	20	28	...
Total Non-Combatants ...	64	34	51	7
Horses—				
Riding { Officers	4	4	6	1
Riding { Non-Commissioned Officers, &c.	82	76	119	24
Artillery { Draught	...	...	...	...
Artillery { Pack	57	46	84	16
Transport	46	6	49	...

In peace, the Turkestan Battery has 6 guns and 6 ammunition wagons, horsed; the West Siberian 2 guns and 2 wagons. In war the Turkestan Battery has 6 guns, 6 ammunition wagons, a spare gun carriage, 1 artillery store wagon, and 43 pack-horses with loads (battery transport); the West Siberian Battery 8 guns, 8 wagons, 1 spare gun-carriage, 2 artillery store wagons, and 44 pack-horses with loads (battery transport).

In addition to the above there are three mountain batteries attached to the Kiev Fortress Artillery, which on mobilisation are expanded into six. These, however, belong properly speaking to the Fortress Artillery, and would probably be employed with the siege train.

To show the difference between an Indian mountain battery and a Russian mountain battery of 2·5-inch guns calculated for service under somewhat similar conditions of country and warfare, the following table may be of some interest:—

Table VII.

India.	Mules.	
Number of guns per battery		6
Ordnance Mules.		
Gun muzzle 1st Line ...	6	
Relief ...	6	
Gun breech 1st Line ...	6	
Relief ...	6	
Carriages 1st Line ...	6	
Relief ...	6	
Axletrees 1st Line ...	6	
Relief ...	6	
Wheels 1st Line ...	6	
Relief ...	6	
Ammunition 1st Line ...	6	
Relief ...	6	
Ammunition Line ...	30	
Pioneers ...	3	
Artificers' Tools ...	3	
Spare Carriage ...	3	
,, ,, Relief ...	3	
Spare (bare-backed) ...	24	
		138
Baggage Mules.		
Officers	...	76
Kits, N.-C. O.'s and Men		
Cooking pots and rations		
Water Mules ...		
Stores, and half wrought		
Office		
Veterinary Stores ...		
Charcoal		
Spare (saddled) ...		
Total ...	...	214

Russia.	Horses.	
Number of guns per battery		8
Ordnance Horses.		
Gun	8	
Carriage Breast ...	8	
Trail ...	8	
Wheels	8	
Ammunition	64	
Spare carriage ..	3	
For Sergeant of Ammunition line	2	
Spare *matériel*	2	
Artificers' Tools ...	4	
Farriers' Tools and Forge	3	
Spare Shoes and Nails ...	1	
Veterinary Stores ...	3	
Line Gear	2	
Spare Wheels and Shafts...	13	
Spare for Guns, &c. ...	2	
Stores ...		
		133
Baggage Animals.		
Officers	7	
Kits, Men's	4	
3 days' ration	10	
2 days' forage	18	
Camp Kettles	4	
Hospital Stores ...	3	
Office and Treasure ...	1	
Shoes and Nails ...	1	
Tents	10	
Line Gear	1	
Spare	6	
		65
Total ...	...	198

Clothing, Equipment, and Small Arms.

The men of the Mountain Artillery are clothed and equipped as gunners of Field Artillery, but have no knapsacks. The tunic consists of dark green cloth, double-breasted, fastening with hooks, and is not cut to the figure, but is worn loose and only gathered in by the waist-belt. The object of hooks and eyes having been substituted for buttons is to permit of clothing being more rapidly fitted on mobilisation. The tunic has a soft stand-up collar of green cloth with scarlet piping, and shoulder-straps fastening with buttons. Breast pockets for cartridges are provided. Their shoulder-straps have the number of the brigade or the initial letter in Asiatic brigades, that of the battery and "Gor"* in the 3 Kiev batteries. The trousers are of dark green cloth, cut short and loose, and worn always in long boots. *Head dress.*—For full dress, cap of black Astrakhan fur with red top. Forage cap—worn in undress and on active service; dark green and flat-topped, with red piping and black band, with number of the battery in yellow. *Great-coat.*—Grey cloth, fastening with hooks, with camel's hair hood, which can be removed. In winter a sheepskin coat, reaching to the knees, is worn under the greatcoat. *Gloves.*—White woollen. There is no difference in dress between drivers and gunners.

The men are armed with Berdan rifles and revolvers. In time of war all gunners have rifles, but in peace only one-fifth of them are so armed, arms for the remainder being kept in store.

The following entrenching tools are carried by a mountain battery: 16 shovels, 16 axes, 16 mattocks, 16 picks, 4 crow-bars, and 4 saws.

Matériel of Mountain Artillery.

The Russian artillery was the first to adopt breech-loading mountain guns. In 1867 the bronze 3-prs., pattern 1867, with a breech-closing apparatus (old flat wedge) was already in use. After the field artillery was armed with the 1877 pattern gun, it was intended that the mountain artillery should be armed with a new gun. The Baranowski gun was selected with Krell's jointed gun carriage.

The manufacture of this gun was discontinued when the idea of screw mountain guns was introduced.

After this, trials were made with Krupp's and Obukov guns of that type, which resulted in the adoption, according to an Imperial Order, dated $\frac{\text{31st May}}{\text{12th June}}$, 1883, of the steel gun, pattern 1883, of 2·5-inch calibre.

At the end of 1885, however, the Russian mountain artillery were still armed with the bronze 3-pr., pattern 1867, with the exception of No. 5 Battery, 38th Brigade, No. 7 Battery, Turkestan Brigade, and No. 3 Battery, East Siberian Brigade, which had the 2 5-inch gun.

"Gor" abbreviated from *gornyi*, which means "mountain."

Three-pounder Mountain Gun, pattern 1867.

This gun (Fig. 1) is 29·5 inches long of 3-inch calibre ; has 12 grooves, increasing in breadth towards the breech. The rifling is from right to left, of an uniform twist of 1 inch 35 calibres.

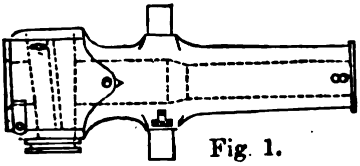

Fig. 1.

The weight of the gun, including the breech-closing apparatus, is 224·02lbs.

The breech-closing apparatus, with the exception of the plate and Broadwell ring, is made of bronze, and is on the flat wedge system. The round plate, in which the Broadwell ring of copper is fastened, is of steel.

Gun carriage.

The gun carriage consists of two parallel brackets of boiler plate, which are connected by three bolts and two trail plates uniting in a trail plate-eye, which receives the pintle of the forked shaft. On the upper trail plate, two hooks are rivetted, to which the check ropes are fastened and hooked on to the nave of the wheel. The axletree is of iron and square-shaped. The weight of the completely equipped gun carriage is 320·827lbs.

The pair of shafts consists of three parts, *viz.*, a wooden cross-piece and two shafts, which parts, after taking to pieces, are packed on the carriage wheel animal. On both ends of the cross-pieces are iron sockets for the shafts. In the centre of the cross-piece, on the top, is the pintle, and below an iron fork with sockets on the ends to steady the shafts.

Ammunition.

Common shell, shrapnel and case-shot are used with the 3-pr. mountain gun.

The shell weighs 8·8lbs., and consists of the two-calibre long shell of cast-iron, over which a thick lead coat is cast.

The bursting charge is 5·4 ozs.

The explosion of the bursting charge is caused by the percussion fuze (Figs. 2, 3, 4)—

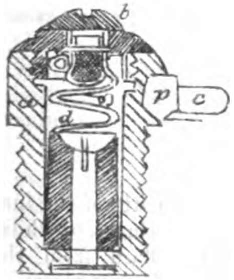

Fig. 2.

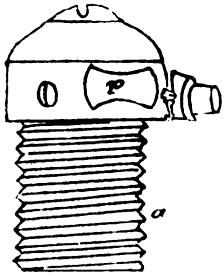

Fig. 3.

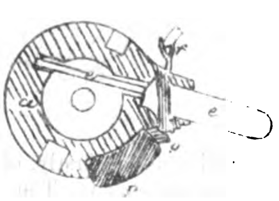

Fig. 4.

which consists of the body (*a*), the detonating cap screw, containing a percussion cap (*b*), the hammer or pellet, with a needle (*c*), the security spring (*d*), safety pin (*e*), and two security wires, (*f*) and (*g*). On the end of wire (*f*) there is fastened a tape, and on the wire (*g*) a lead weight (*p*). The former prevents the weight (*p*), which is fastened by the wire (*g*), from shifting; the latter prevents the safety pin from falling out. Before the projectile is placed in the gun the wire (*f*) is removed, and by this the wire (*g*) is partly loosened. This prevents the safety pin from falling out. The safety pin, now free to move, is whirled out by the centrifugal force due to the rotatory motion. On impact or graze the hammer flies forward and compresses the security spring (*d*). The needle comes in contact with the detonating cap, and causes the ignition of the bursting charge.

The shrapnel consists of an iron body, round which a thin leaden coat is cast by means of a chemical process. Over the mouth of the powder chamber rests a disc of wrought-iron supported by a shoulder, through the centre of which a tube is placed which contains some part of the bursting charge.

The percussion ring fuze is used for the shrapnel (Figs. 5, 6, 7, 8), and consists, firstly, of the body (*a*), with which all other parts of the fuze are connected. The upper portion receives the detonating cap, whilst below the blowing-chamber is the channel by which the flash from the pellet reaches the bursting charge. A shoulder on the lower portion of the body serves as a bed for the priming ring, which is kept in position by the screw (*b*) above it. The fuze is screwed into the projectile by the thread on the lower portion of the body.

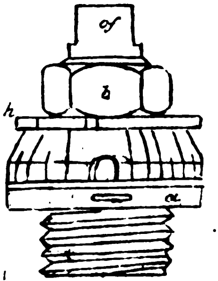

Fig. 5.

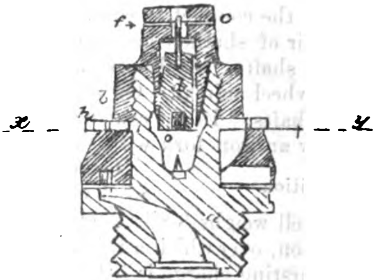

Fig. 6

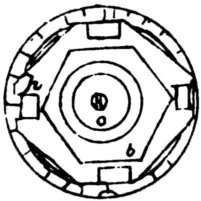

Fig. 7.

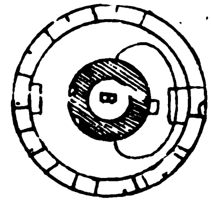

Fig. 8

The percussion apparatus consists of the detonating bolt (*c*) with the hammer (*d*); the latter contains the primer in its lower extremity, the needle being fixed in the body of the fuze opposite it. The hammer has in its upper extremity a ring of brass wire, through which the wire (*f*) passes, thus maintaining the hammer in its place.

On the outside of the priming ring is cut a scale for turning the fuze composition, which is calculated to burn for ten seconds. On the inner side of the ring a channel is cut, by which the flash of the detonating cap reaches the fuze composition. Above the priming ring a plate (*h*) is fixed, which is connected with the priming ring by means of two nipples, and has two small holes for the teeth of the key. The last named parts are held in position by a nut (*b*).

During transport a plug is substituted for the percussion apparatus; The latter is fixed immediately before the projectile is placed in the gun.

On firing the gun, the wire (*f*) is torn apart, the hammer (*d*) strikes the needle, which explodes the detonating composition, the ring of fuze composition is ignited by the flash, and burns to the time fixed by the scale; the flash is then instantaneously conveyed into the blowing-chamber and thence into the shell.

The shrapnel, complete, weighs 10·6lbs., and contains 70 balls, each weighing about 0·42oz., and composed of lead and antimony (4 parts lead and 1 part antimony).

The case-shot weighs 7·36lbs., and contains 48 balls of lead and antimony in six layers. With the 3-pr., ordinary and reduced charges are used. The former contains 12 ozs., the latter 5·12 or 2·17 ozs. of powder respectively in an ordinary silk bag.

The powder used with the mountain guns is composed of 75 parts of saltpetre, 10 of sulphur and 15 of charcoal.

The grain is coarse, from 6·35 to 10·16 millimetres; the specific gravity 1·66 to 1·7.

Friction tubes of pattern 1875 are used.

The ammunition is packed in wooden boxes, of which the lid and corners are clamped with sheet iron. Two rings, which are fastened on the back of the boxes, serve to hang the boxes on the pack saddle. To prevent these boxes from swinging, another ring is fastened at the bottom, by which the boxes are connected beneath the belly of the animal.

The inside of the boxes is divided into compartments. Each compartment contains six projectiles, besides the cartridges, and one case-shot with cartridge. One compartment contains friction tubes, and another compartment small stores, &c. With the ordinary cartridge the initial velocity of the shell is 669·09 feet; the initial velocity of the shrapnel is 659·67 feet.

When the reduced charge is used the initial velocity is lowered to 417·09 feet.

The Baranovski Mountain Gun.

This gun (Fig. 9) is constructed of cast steel, and consists of a tube, strengthened for half its length by a jacket, which is put on hot.

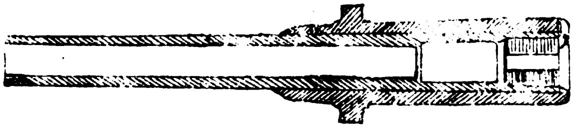

Fig. 9.

The calibre is 2·5 inches; therefore less than that of the 3-prs. The bore has shallow grooves, with a uniform right-handed twist of 1 turn in 30 calibres. With the breech apparatus the gun weighs 217lbs., and is, therefore, lighter than the 3-prs.

The breech-closing apparatus is on the screw bolt system. Obturation is obtained by means of a metallic cartridge like that of the infantry rifle and that of the late French gun (system Reffye, canons de 7), and therefore no Broadwell ring is required. By closing the breech, a spring hook, which is fixed on the base plate, catches the rim of the cartridge. As the question has been raised several times as to the employment of obturation cartridges, and they are actually employed for the revolving gun system Hotchkiss, I have thought that an illustration of the Russian shell cartridge of the Baranovski mountain gun (Fig. 10) would be interesting.

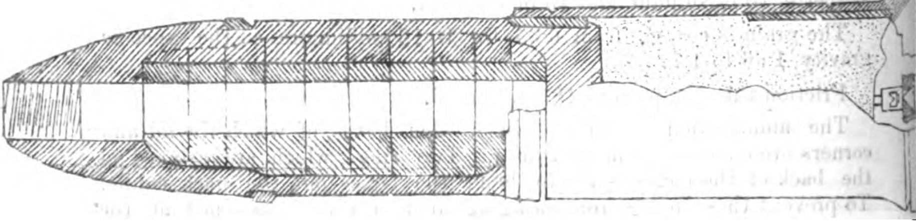

Fig. 10.

The cartridge is like that of the modern infantry rifle.

The mechanism for firing the gun is fixed in the breech screw and base plate, and is similar to the lock of a bolt action rifle. By opening the breech the main spring is compressed automatically. The spring cannot be released before complete closing has taken place, because the pin is kept secured by a safety spring. By pulling the lanyard the safety spring is released, and the main spring drives the pin against the percussion cap of the cartridge.

The Krell's gun carriage (Fig. 11) consists of the front part (*a*) with the axles and the trail (*b*); both these parts are connected by hinges (*x*), (*y*), and by a bolt (*z*). The end of the trail has a bronze trail plate with a trail plate-eye. The trail is so shaped as to fix into the ground, and thus check the recoil.

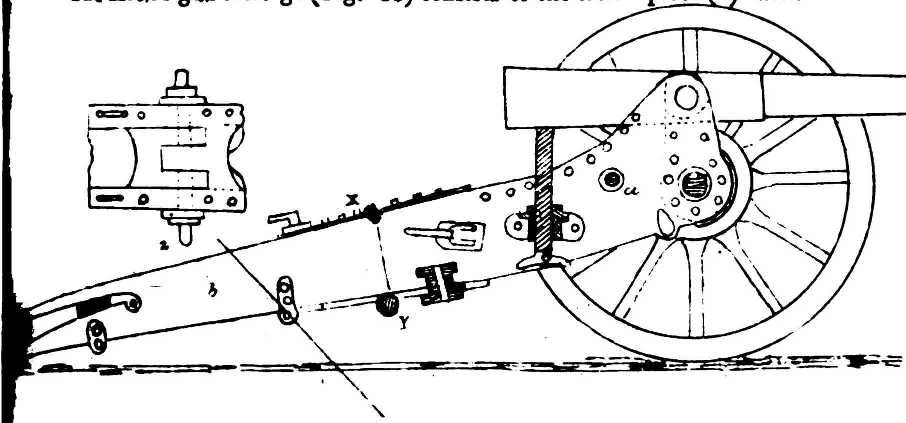

Fig. 11.

The forked shaft differs from that of the 3-pr. carriage in having no cross-piece. The pintle is fixed in the centre of the iron fork.

The following ammunition is used in the Baranovski gun, *viz.*, ring-shell and shrapnel; both have the same fuze as the 3-prs.

The 3½ calibre long projectiles take the rifling by means of a copper ring close to the head of the projectile. At the base of the shell (*vide* Fig. 8) are two grooves which connect the cartridge case with the projectile. The base of the case is strengthened by an outer and inner base cap, and the bottom is closed by a cast-iron disc. In the centre of the latter a cup-shaped screw is cut, in which the percussion cap is placed. The screw is covered by a steel disc, which forms a projecting rim necessary for extraction. The ignition is caused in a similar manner to that of the modern infantry rifle.

The ring shell weighs 9lbs. 2 ozs., and contains 2·06 ozs. of bursting charge.

The shrapnel is of similar construction to that of the 3-prs. It contains 88 hard lead balls, each weighing 0·42 oz, and 1·34 oz. bursting charge.

The powder charge weighs 13·5 ozs.

The 2·5-inch gun, pattern 1883.

Of this gun, which is to replace the two mentioned above, but few particulars are available. But the whole of the material is new, and has been worked out by the Artillery Committee.

The ballistic tables of the Baranovski gun are not yet published.

The following tables give a few details of the British and Russian mountain guns, with their charges, projectiles, &c. :—

TABLE VIII.

		Gun.		Bore.				Rifling.					Shell.					Shot.			Velocity.		Gun and Carriage.	
										Grooves.			Common.		Shrapnel.			Case.						
		Total weight.	Length.		Length.	Calibre.	Diameter, powder chamber.	Twist.	Length.	Number.	Depth.	Width.	Weight, empty.	Bursting Charge.	Weight, empty.	Bursting Charge.	Number of Bullets, &c.	Weight.	Number of Bullets, &c.	Powder Charge.	Muzzle	At 1,000 yards.	Total Weight.	Carried by
		lbs.	ins.	ins.	cals.	ins	ins.	cals.	ins.		ins.	ins.	lbs.	ozs.	lbs.	ozs		lbs		ozs	F. S.	F. S	lbs.	Animals.
Great Britain	Heavy ...	400	70·45	66·5	26·6	2·5	2·56	80 to 30	54·73	8	·05	·51	7·25	4	7	·5	121	6·75	162	24	1440	1028	943	5
	Light ...	200	41	36	11·3	3	3	20	34	3	·1	·6	6·89	6·5	6·8	·5	42	6·25	70	12	968	786	550	3
Russia	Bronze pattern 1867 ...	234·02	29·5	34	8	3	3·149	35	13·4	12	·05	·6 to ·5	8·8	5·4	10·6	1·3	70	7·36	48	12	697	579	538	3
	Steel pattern 1883 ...	217	39·8	33·6	...	2·5	...	40 to 20	...	20	...	...	8·8	4·35	...	...	...	...	...	13·5	933	760	...	4
	Baranovski ...	217	47·6	42·1	16·84	2·5	2·59	30	35	20	·024	·7 to ·64	9·1*	2·06	9·1	·35	88	8·73	41	13·5	950	772	638	4

* Ringshell.

The Krell's gun carriage (Fig. 11) consists of the front part (*a*) with the axles and the trail (*b*); both these parts are connected by hinges (*x*), (*y*), and by a bolt (*z*). The end of the trail has a bronze trail plate with a trail plate-eye. The trail is so shaped as to fix into the ground, and thus check the recoil.

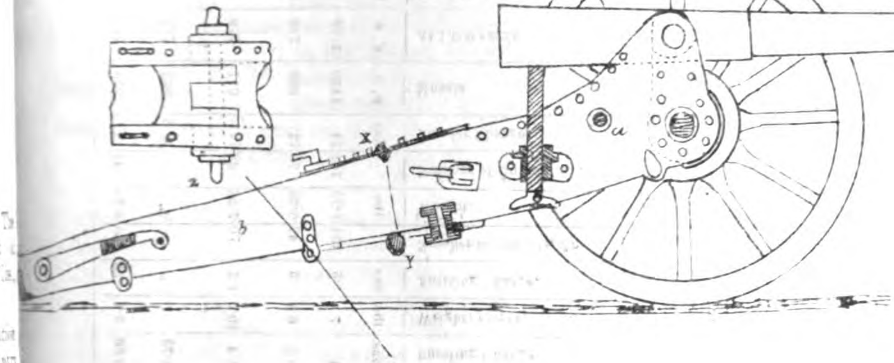

Fig. 11.

The forked shaft differs from that of the 3-pr. carriage in having no cross-piece. The pintle is fixed in the centre of the iron fork.

The following ammunition is used in the Baranovski gun, *viz.*, ring-shell and shrapnel; both have the same fuze as the 3-prs.

The $3\frac{1}{2}$ calibre long projectiles take the rifling by means of a copper ring close to the head of the projectile. At the base of the shell (*vide* Fig. 8) are two grooves which connect the cartridge case with the projectile. The base of the case is strengthened by an outer and inner base cap, and the bottom is closed by a cast-iron disc. In the centre of the latter a cup-shaped screw is cut, in which the percussion cap is placed. The screw is covered by a steel disc, which forms a projecting rim necessary for extraction. The ignition is caused in a similar manner to that of the modern infantry rifle.

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		Gun			Bore				Rifling				Shell					Shot			Velocity		Gun and Carriage	
											Grooves		Common		Shrapnel			Case						
		Total weight	Length		Length	Calibre	Diameter, powder chamber	Twist	Length	Number	Depth	Width	Weight, empty	Bursting Charge	Weight, empty	Bursting Charge	Number of Bullets, &c.	Weight	Number of Bullets, &c.	Powder Charge	Muzzle	At 1,000 yards	Total Weight	Carried by
		lbs.	ins.	ins.	cals.	ins.	ins.	cals.	ins.		ins.	ins.	lbs.	ozs.	lbs.	ozs.		lbs.		ozs.	F. S.	F. S.	lbs.	Animals.
Great Britain	Heavy	[illegible]	[illegible]	[illegible]	20·0	2·5	2·80	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	7·25	6	7	3	[illegible]	[illegible]	[illegible]	[illegible]	1440	[illegible]	[illegible]	3
	Light	200	61	36	11·3	3	3	30	36	3	1	[illegible]	6·00	4·5	6·6	5	[illegible]	[illegible]	70·12		[illegible]	700	[illegible]	3
Russia	Bronze pattern 1867	[illegible]	30·5	36	8	3	2·10	[illegible]	13·6	[illegible]	[illegible]	[illegible]	6·6	3·6	10·6	1·3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	870	[illegible]	3
	Steel pattern 1883	[illegible]	[illegible]	[illegible]		2·5	—	[illegible]	—	[illegible]		—	[illegible]	4·25	.	.	.			13·5	[illegible]	700		4
	Baranovski	117	[illegible]	[illegible]	10·0	2·5	2·80	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	4

* Degrees.

Ammunition boxes.

The ammunition boxes are constructed of metal plate, and contain 9 compartments, in which 4 shells and 4 shrapnels are placed. The ninth compartment contains small stores, &c.

Loading up of the Mountain Guns.

In the ordinary mountain batteries the whole of the *matériel* is carried on pack-animals, whereas in the horse artillery batteries the guns are drawn and the detachments mounted. Shafts are carried with all the batteries, so that the guns can, if necessary, be transported on their wheels.

To carry the 3-prs. three pack-animals are necessary. (Figs. 12, 13, 14.)

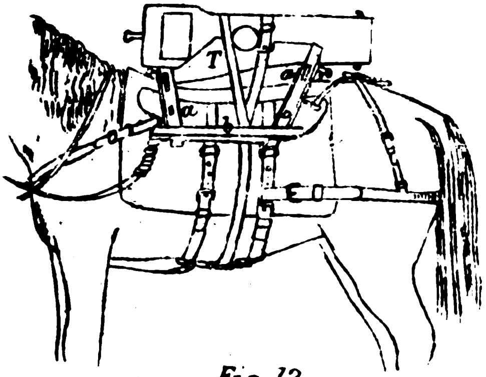

Fig 12.

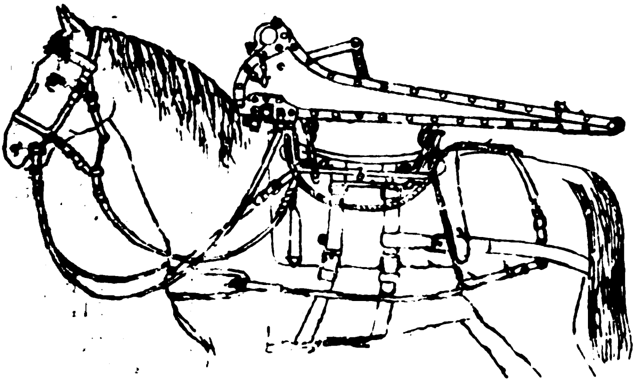

Fig 13

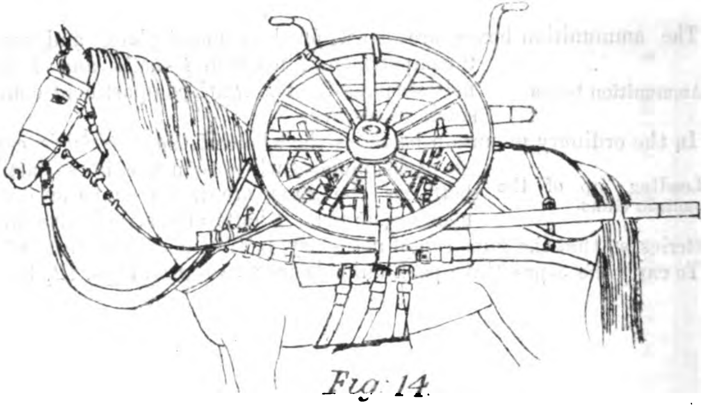

Fig. 14.

One carries the gun (Fig. 12), the second the gun carriage with the axle (Fig. 13); the third carries the wheels and shafts (Fig. 14).

For the 2·5-inch or Baranovski gun one more pack-animal is required to carry the second part of the gun carriage.

The ammunition boxes are carried in pairs.

The pack saddles are interchangeable.

For the horse artillery batteries (Fig. 15) limbers and an ammunition wagon per gun are provided. Four horses or mules are required per gun.

The forked shaft has to be connected with the gun carriage to enable the gun to be drawn; the pack-animal which carried the wheels is put into the shafts, and the gun carriage pack-animal is hooked on as leader (Fig. 15).

The ammunition wagon has two wheels, and requires three horses or mules.

The whole of the material can be taken to pieces and carried on the horses or mules if necessary. For this purpose the whole of the draught horses are provided with pack saddles, and the riding saddles are also fitted for pack purposes.

The supply of Ammunition.

The supply of ammunition for the Russian mountain gun is as follows:—

TABLE IX.

PROJECTILES.	3-pr. Battery.	Battery with Baranovski guns.	Horse Battery.
Common Shell	336	544	144
Shrapnel Shell	336	544	144
Case-shot (with cartridges)... ...	112	......	48
Cartridges	672	*	288
Friction Tubes	980	1,360	430
No. of rounds ...	784	1,088	336

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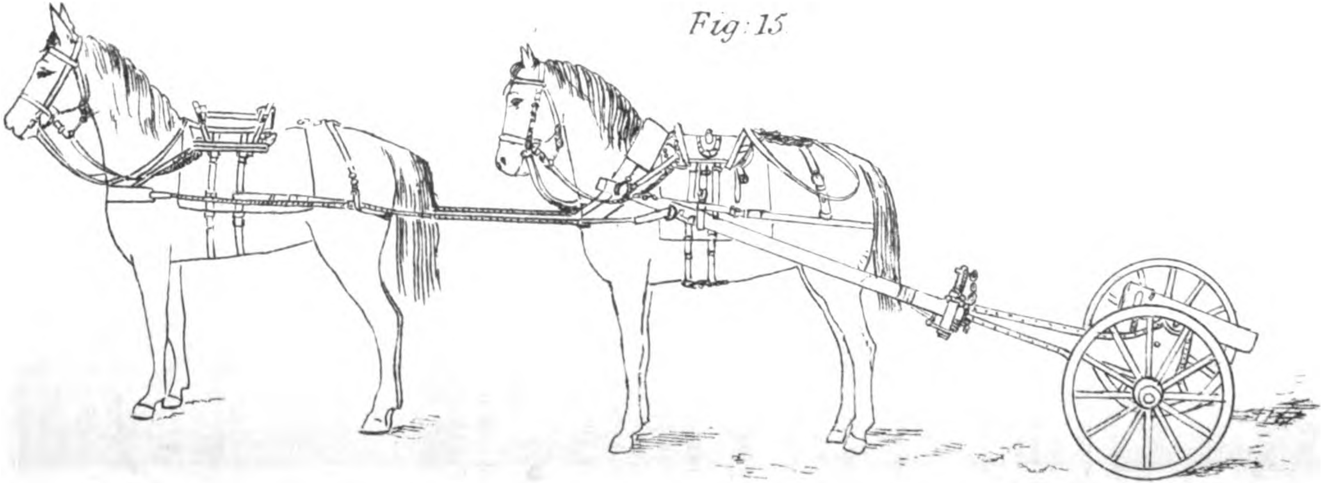
*As already mentioned the cartridges of the Baranovski gun are connected with the projectile.

Fig: 15



The number of rounds per gun is as follows :—

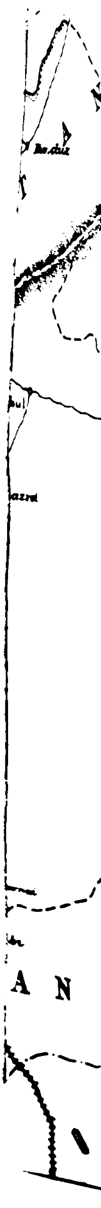
PROJECTILES.	3-pr. guns.	Baranovski gun.	Horse Artillery gun.
Common Shell	42	68	18
Shrapnel Shell	42	68	18
Case-shot	14	......	......
No. of rounds ...	98	136	42

For carrying ammunition the 3-pr. battery has 112, the Baranovski's battery 136 and the horse artillery battery 48 ammunition boxes, which are carried as mentioned before, two boxes on one pack-animal.

Conclusion.

In the numerous engagements which have taken place of late years in the interior of Asia, the Russian mountain artillery had many opportunities of being usefully employed and saving the infantry many unnecessary losses.

In the war with the Turks the mountain artillery achieved great success, and was employed in the passage of the Danube at *Zimnitza*, in the action of the *Shipka Pass*, and at the two passages of the Balkans, and was always able to follow the infantry on account of the light weight and great portability of the guns. In a great European war the mountain batteries would seldom have an opportunity of acting successfully, because, although armed with the latest pattern gun of 1883, these would be far inferior in effect to the light field guns.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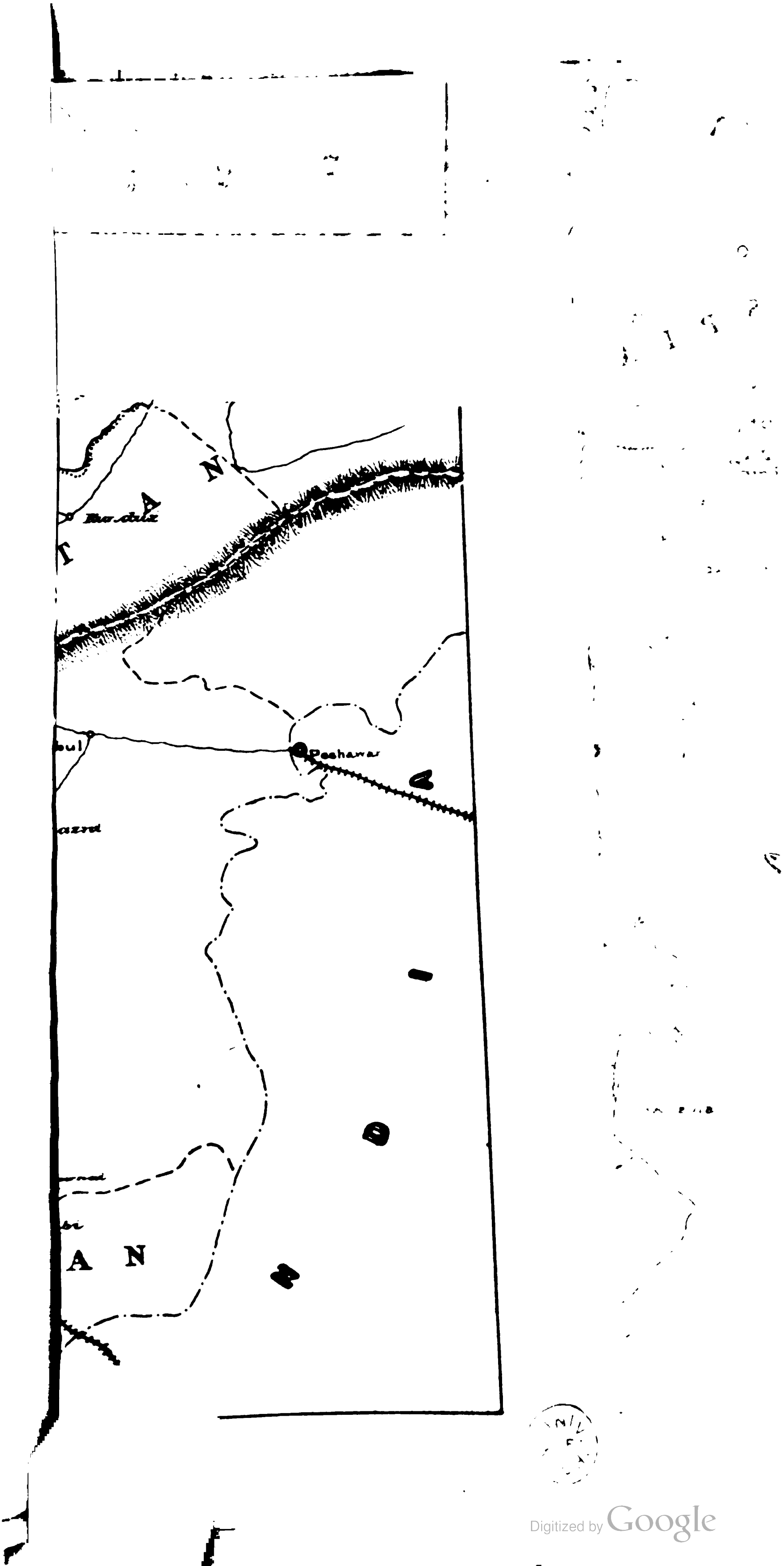
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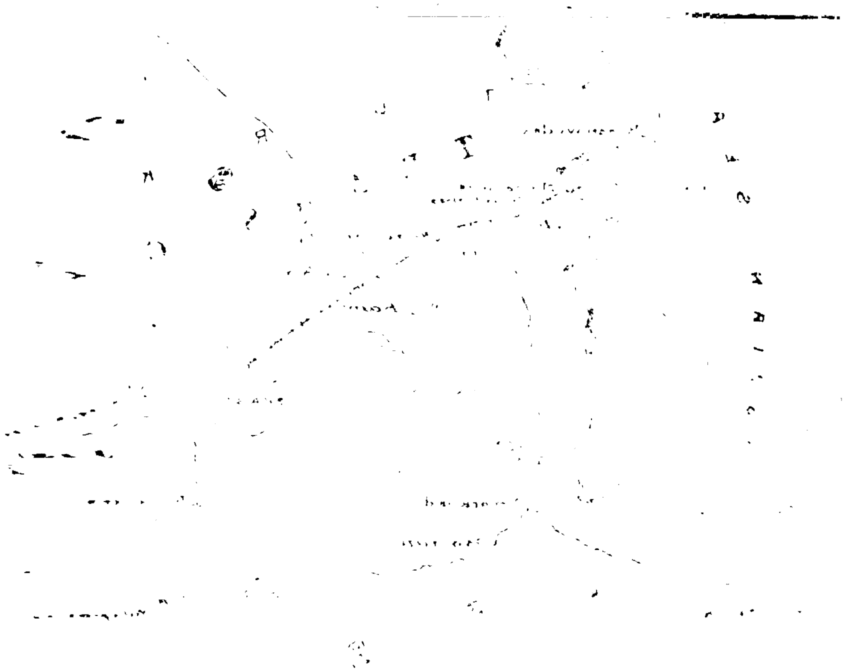

THE TRANS-CASPIAN MILITARY RAILWAY,

By Dr. O. Heyfeldir, Councillor, St Petersburg, and formerly Chief Medical Officer of Skobeleff's Akhal-Tekke Expedition ;

TRANSLATED FROM,

German International Revue of Army and Navy for April 1887, edited by Ferd V. Witzleben-Wendelstein, Cassel,

BY COLONEL W. LUCKHARDT, C. B., A. D. C.

The Trans-Caspian, so far as we know, is the only large railway in the world which has been built and is administered by the Military. War was the cause that led to its construction, while strategical reasons have enforced its completion. It therefore fully justifies the name it bears as a Military railway. The completion of this railway forms the conclusion of the conquest of Trans-Caspia, in the same way as the subjugation of the Akhal and Merv oases does that of Turkestan. Two centuries have passed during which Russia has been obliged to conquer the country inch by inch until she has succeeded in laying down her railway from the East shore of the Caspian to the Oxus. Peter the Great was the first to secure a permanent hold of the shores of the Caspian sea. On Khiva asking his protection against the too powerful Boukhara, he entered into an alliance with the Khanates. During 1797 and 1826 Russia was at war with Persia, both campaigns resulting in the surrender of territories to Russia. For more than half a century the fight lasted with the Caucasian mountaineers, and only ended in 1859, in the subjugation of Eastern Caucasus. Turkestan was conquered in 1865, and was created a province with a Governor-General. The conquest of Khokand took place in 1866, that of Samarcand and Boukhara in 1868, and that of Khiva finally in 1873. The circular despatch of Prince Gortschakoff dated 3rd December 1864 forms a really classical document on the subject of these conquests ; the past it represents in a lucid manner, the future it foretells like a prophet. "The situation of Russia in Central Asia is the same as that of all civilized states which come in contact with semi-barbarous tribes who lead a nomadic life and who have no settled organization. For the protection of its frontiers and its trade the civilized state finds itself compelled to exercise its power against a neighbour who is a source of constant annoyance, and in view to put a definite end to this state of affairs, the matter is solved by his subjugation. When things have thus reached a peaceful condition the subjugated province in its turn becomes unsettled through the attacks

of other tribes adjoining it. The state is obliged to protect its subjects against plunder and to punish the plunderers. Thus arises the necessity to undertake distant, costly and frequent expeditions against an enemy whose organization renders him inaccessible. If one restricts himself to simply punish the plunderers such a lesson is soon forgotten, and the retreat is generally put down to weakness. Asiatics respect only power when it makes itself felt. The moral power of justice and the interests of civilization have no weight with them. Nothing is gained therefore by such action : one is always obliged to commence afresh. Consequently, there is no choice between dropping the matter for good and all, or continuing the advance which step by step leads into more uncultivated and difficult countries. This has been the experience of the United States in America, of France in Algiers, of Holland in its colonies, and of England in India. They were all obliged to pursue such a course, which had its cause less in ambition than necessity, and in which the greatest difficulty is to decide upon the proper moment when to stop." In accordance with this law the East shore of the Caspian sea was first seized, then followed Akhal-Tekke oasis, Merv, Pendshe.* Trans-Caspia was thus organized and the railway built in Central Asia. We have thus given a sketch of the railway showing how far its necessity was the outcome of war ; we will now discuss an account of its construction. The invention and extension of railways appertain to the present century. The first strategical railway was the one which the French built temporarily at Balaclava in the Crimean war. But this was an isolated instance, from which no deductions could therefore be drawn. A systematic application of railways for purposes of war was first made in the Secessionist war in North America. Here, railways were made to serve offensive as well as defensive operations, and to facilitate the removal of the wounded from the battle-field. Special railway detachments we first meet with in the Franco-German War in the German Army, where they were formed to meet the wants created by war preparations, and they consisted of 1 Bavarian and 5 Prussian special railway Corps. The experience thus gained led to the definite introduction of a permanent railway regiment in the German Army, and this led to the formation of railway battalions in the Russian Army. General Annenkoff, Chief of the Transport in Russia, had made a special study of this subject during the Franco-German War, at the termination of which he published a book entitled "The war of 1870. Impressions and Notes of a Russian officer." In the Russo-Turkish War he had the Troop-Transport under him as far as the Danube ; here again, he applied himself specially to a study of the perfection of the railway arrangements for military purposes. Everything that Russia now possesses in this direction she owes to him. We would specially observe here that the system he has organized does not merely consist of pure imitation of German arrangements, but it has been treated in a rational adaptation of the same to meet Russian requirements.

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* Panjdeh.

Already in 1872 special railway detachments were formed in Russia. By the German system the railway regiment is formed from recruits who have to acquire a knowledge of military duties as well as a special technical training, while Annenkoff's Russian system is to form the regiment from men who have already obtained military proficiency by a service of a year and a half in the ordinary line regiments. These, therefore, are men who have a military training and have only to go through the technical portion of it, and to facilitate a quick acquisition of it those men are selected who have prior to their enlistment served on some railways, or who have gone through a course in a technical school, or who by their original callings such as carpenter, blacksmith, &c., have special aptitude for the work. Strict supervision is exercised to see that these qualifications are entered in the regimental lists in view to the information being readily obtained when required. Soldiers who serve in the railway battalions remain as reserves attached to them on completion of their active service. These men thus offer a ready nucleus from which new battalions can be formed, if necessary. The Russian army now possesses four railway battalions which are located in St. Petersburg, Warsaw Kiew and Riga. A special reserve railway battalion was formed in 1880 for laying down the Caspian railway. In 1885 a Transcaspian railway battalion, No. 2, was formed for the extension of the Caspian railway. The former reserve battalion thus became Trans-Caspian Railway battalion No. 1. In 1879 the Akhal-Tekke Expedition failed, and in consequence it was resolved in 1880 to send out a fresh and larger expedition against the Tekke- Turcomans, the command whereof was handed over to Michael Dimetriewitsch Skobeleff. The latter, in view to overcome the difficulty of marching through the waterless desert which had till then proved the chief obstacle to all military operations, and thus to ensure success, demanded a railway from the Caspian to the oasis. The construction of this railway was handed over by the war Minister to Lieutenant General Michael Nikolajewitsch Annenkoff, who as we said above, was at the head of the Troop-Train-Transport in the Empire, and who had organized special railway corps, and laid down 3 small railway lines with their assistance. One of these was laid down in 1871 in the neighbourhood of St. Petersburg, when in connection with the Krassnoselsk Camp of Exercise a railway was improvised to connect Zarskoe Selo with Krassaoe Selo and Peterhof. A second in June 1882 in Moscow for the Camp of Exercise there, and the third at Sebastopol in 1874. In accordance with the system introduced by him Annenkoff formed a reserve railway battalion at once. One thousand men were selected from different regiments out of those who were noted as having special aptitude for railway work. Moscow was fixed as its place of assembly. Special Officers and a Commandant as well as Medical officers were appointed to it. A Field Hospital was attached to it. This regiment was sent in two detachments by a railway as far as Zaryzin and Astrakhan, from which places they were despatched by steamers of the "Kawkas-Merkur" Company to Krasnovodsk whence they were transferred to

Michaelovsk by means of boats. Here, it at once commenced its work in a double direction, *viz* :—one part of it was employed directly on railway works and the other in the erection of workshops, magazines, huts, hospitals, and all such necessary buildings. In a short time the desert shore became full of life. A "nobel" steam machine converted the sea water into sweet. Labourers from Astrakhan, Petrowsk Baka, hired Russians and Persians, arrived in hundreds, which soon swelled to thousands, to assist in the making of the road work. These had to be housed as well as fed. The officials, officers and men, were put under shelter in tents or in barracks. The labourers made their own huts, or were housed in large tents and wooden barracks. Provisions for men, hay, oats and barley for animals, were brought by ships from Baku, Tenkoran, Astrabad and Astrakhan. The total material required for the railway was brought partly by ships down the Volga and the Kama, and across the Caspian sea, and partly by railways to those points whence water carriage became necessary. A hundred versts of railway line and fifty versts of horse tramway were completed during the Campaign and handed over for traffic. Thus we, the members of the expedition, were enabled to return comfortably seated in a railway wagon through the waterless desert, which it would have taken us several days to march through under great privations suffering from heat, thirst and hunger. This shortening of the march, and the comfortable way in which it could be performed, proved of the greatest benefit for the quick removal of the sick. The whole distance up to Kizil-Arvat, namely 216 versts was completed in 1882, and thus the desert was covered by a line from the Sea to the oasis. The railway battalion remained in Trans-Caspia on the completion of this line and was employed in connection with it. Its administration was handed over to Officers under the War Minister. Three trains weekly up and down the line carried on the passenger as well as the general traffic, and the Post, and ensured the safety of the fortified places and their garrisons which were posted for its protection. The submarine telegraph line which leads from Baku to Krasnovodsk was extended by a land line as far as Geok Tapa during the Campaign, and as it runs along the railway line it was used for the latter and finally handed over to it for administration. Michaelovsk and Kizil-Arvat which form the terminal-stations quickly rose to be prosperous places. Houses grew up apace for which the quarries of Balchane supplied materials. Thus arose shops, magazines, transit agencies, and the inhabitants of the country, the Yomuts and the Tekkes, were not slow in taking to the railway for journeys and pilgrimages. We have specially to mention that the determination to build the railway was due to the temporary and local necessity that existed of forming, as quickly as possible, a short and secure road for the Expedition of 1880. Consequently, the choice of the starting point as well as the railway itself did not meet completely, in many conditions, the requirements of a general and permanent railway traffic, when a few years later the order was received to complete, with the help of this part railway, one a thousand versts long to connect the Caspian sea with Central Asia. Meanwhile, Merv with its oasis had been annexed to Russia, and our sphere of power had thus considerably extended towards the East. This influence was felt by both Afghanistan and England. During the winter of 1884-85 negotiations took place between the Governments of Great Britain and Russia, but in the spring following an understanding was far from being arrived at. In the month of March the battle of Kusch took place. At the end of April 1885 the order was received to extend the hitherto local railway up to Charjui—to the extension of 780 versts, and its construction was entrusted to General Annenkoff. This officer had, meanwhile in 1882, constructed the 135 versts long Shabinsk-Pinsk Railway in Poland and had displayed in its contruction, not alone technical capacity, but also extraordinary economy. This railway which was made by order of the War Minister, and partly with the help of the military, was built much cheaper than any other railway in Russia, and considerably below the cost of even those railways which had been built under the auspices of the Minister of Finance. The cost was only 16,000 roubles per verst; this does not include the rails and rolling stock which were obtained from other railways. As now the extension of the Trans-Caspian Railway was undertaken by the War Minister, it may easily be understood why a second and larger experiment to build cheap railways was also entrusted to the same man who had built the Shabinsk-Pinsk Railway, and who had also laid down one from Michaelovsk to Kizil-Arvat. It was, moreover, considered that as the General had been for some time in the country, he was to a certain extent acclimatized, and besides, well conversant with the climate, the special conditions and difficulties which the erection of railway in these parts would have to contend against. For the conditions of life and labor in Trans-Caspia are by no means ordinary, and can scarcely be called favorable. An European there, as in all hot climates, is much inclined to sickness during the Spring and Summer months. Besides special places—the haunts of fever—where it is of an intermittent nature, the European is much disposed to affections of the bowels, intestines and the liver brought on by the European custom of living, with its several meals, and with it the consumption of spirits during the hottest time of the day. The evil is also aggravated by the light clothing which the European wears. Where there is a crowd, abdominal typhoid fever generally prevails; this was experienced in 1880-81 during the expeditions, as well as in 1885 when the railway was being constructed. These conditions are well known to me as I was the chief medical officer of Skobeleff's Army. Although the country offered no difficulty in shape of mountains and rocks, there were three important rivers which had to be bridged over, *viz*, the Tedsch, Murghab and Amu Daria, as also the several watercourses and irrigation canals which are so necessary for the cultivation of the country. The greatest difficulty, however, was experienced in the waterless regions, and where the moving sand presented immense obstacles. This was especially the case between Michael Bay and Mollah Kari, but was happily got over by a special system which has proved itself a permanent and effectual protection against it.

The formation of a 2nd battalion was taken in hand immediately on receipt of the order in the Spring of 1885 to extend the railway. It was called the Trans-Caspian Railway Battalion, No. 2. The system which had all along been found efficient, namely, of drawing men of special aptitudes from different regiments was again resorted to. On the 26th of April the order was published. On the 10th of May the men had already commenced to arrive at Moscow, and on the 30th of May the battalion was complete. The men were here clothed and equipped in accordance with the requirements and regulations for Trans-Caspia, and after inspection by the Governor General, Prince Dolgorukow, sent in two detachments by rail and steamer *via* Wladikawkas, Petrowsk and Michaelovsk to their destination. They arrived at Kizil-Arvat on the 21st of June, and on 1st July commenced their work. This quick, unforeseen and therefore unprepared organization of a special battalion of 1,000 men proves the efficiency of the system in vogue, and there is no doubt that the same result could be achieved in time of war with the same promptitude. When the extension of the railway had thus been ordered there were two special points to which attention was directed, *viz.* (1) the finding of a better harbour and consequently a better landing place, (2) the proper road for the extension of the existing line as far as the Oxus and from there to Samarcand. The difficulties which Michaelovsk presented as a landing place had naturally to be improved upon, if the new railway was to meet its object, *viz*: to form a permanent and much frequented traffic route between Russia and its Central Asian possessions. As Michael Bay was shallow, all the larger ships, especially the Postal steamers of the Caspian Sea and the large sized barges of the Volga, had to stop at Krasnovodsk, whence men and goods were sent in flat boats towed by steam tugs to Michaelovsk. Behind the Islands of Ran and Uzun-Ada the channel becomes narrower and turns into a most irregular and tortuous course on account of the sand-banks and islands. The transport between Krasnovodsk and Michaelovsk took therefore from 18 to 20 hours, the transhipment in the most favorable case 1 to 2 days, otherwise 3 days, and sometimes more. Thus the landing at Michaelovsk entailed an unnecessary delay of at least 2 or 3 days and proved withal an expensive one. It became obviously necessary to find out for the commencement of the railways a point which sea-going steamers could touch and where direct shipment from the stream to the railway could be made. Krasnovodsk appeared to offer these advantages, as the bay there possesses a good depth of water; it does not freeze in the winter, and the place itself had already been selected for the seat of authority, custom-houses, &c. The extension of the railway from Michaelovsk to this place would have necessitated an addition of 125 versts in a north westerly direction; but as this part of the country is traversed by three mountain ranges and as there is no water the whole way, this undertaking, with its tunnels and borings, would have taken a considerable time and proved, moreover, a very expensive one involving an outlay of millions of roubles. After complete survey of the shores and the levels and after comparison of different estimates, the choice of the General fell on the Island of Uzun-Ada which is situated in the northerly entrance of Michael Bay. This necessitated an extension of 25 versts of the Railway towards the west as also the deepening of Uzun-Ada to a certain extent to make it deep and capacious enough for a number of ships of great draught. In October 1885 the selection of the Bay of Uzun-Ada was finally settled, and the harbour works, as well as the construction of the railway, were at once taken in hand. On the 10th of May 1886 the line was opened. The fact that a steamer could anchor in the Bay of Uzun-Ada and that its cargo could be transhipped direct to the railway, shortened the voyage and avoided numerous transhipments. The transport cost has thereby been reduced from 1 to 3 kopecks per "pud." The traffic increased to such an extent that in the autumn of 1886, the Bay was full of ships; it had 8 landing places owned by several companies. There were, besides a railway station, hotels and boarding houses, workshops and a number of private buildings. Thus within a year the Trans-Caspian Railway had been supplied with a new and efficient terminus which simplified very much the traffic with Baku and Astrakhan. Meanwhile, on the other side the construction of the line through the Akhal oasis had been commenced at several points, and the work there was proceeding with incredible speed. In the beginning of May 1885 the General arrived in Trans-Caspia. On the 2nd May the first rails were put down from Kizil Arvat towards the East. On the 29th November the Railway was opened as far as Askabad, on the 2nd May 1886 as far as Merv, and on the 30th November as far as Charjui. This the 507 versts long line to Merv had been completed in one year, the railway up to Amu Daria 759 versts in one year and a half. From these 447 days the following non-working days have, however, to be deducted:—30 to 45 days in Summer, when owing to extreme heat the work had to be suspended: 10 to 15 days, when the same had to be done on account of the cold: 15 to 20 days in the month of March, when owing to continual rain it was found impossible to work: and 15 days in May owing to floods in the river Tedsche. This reduces the total time required to about a year. However, what was thus impeded by the unfavourable nature of the climate &c., was made up by the energy displayed. Daily 3½ versts of rails were laid down, sometimes even as many as 4½ versts. This work was performed by the soldiers of the 2nd Railway Battalion under the supervision of their officers, while earthworks were thrown up by hired labor—400 Russians, Jomudes, Bucharans, Persians and Tekkes in very large numbers, sometimes as high as 18,000 along the line. Even to these labour-columns Military organization was given. Every 100 or 50 of them were placed under a non-commissioned officer of some standing, who acted as a supervisor, while privates of the Railway Battalion and hired Russians served the purpose of instructors. The country itself contributed very little indeed towards a supply of the required materials. In fact one might say that all it gave was earth for the earthwork. It did not even supply sufficient water everywhere. But in the vicinity of the Balkan and the mountainous ranges of Kjure-Dag and Kopet-Dag the necessary stones were found for building bridges, aqueducts and railway houses. The oasis, especially the Tedsche, supplied good materials for bricks. On the other hand the whole of the wood and iron required had to be procured from Russia. This was conveyed by the railway itself. Thus not alone material trains had to keep up with the labourers but also barrack-trains for the soldiers, Officers, Engineers and supervisors. Besides furnishing living accommodation these (latter) trains had carriages which formed offices, kitchens, hospitals, dispensaries, baths, &c. &c., As the work progressed and the railway advanced, these trains of necessity followed them. They, moreover, offered to the constructors facility to inspect the line and to render assistance where necessary, such for instance as that required when the Murgbab and Tedsche overflowed and inundated the line. The great obstacles which had to be overcome in the construction of the railway consisted in the total absence of all roads, wagons and means of transport. Carts were unknown, and were in fact first introduced by the Russians, before which all transport had to be carried on by means of pack animals. All our ammunition and provision had at the time of the expedition, to be carried by means of the camels to the oasis. It was by means of horses and camels that the Tekkes were enabled to remove their goods, chattels and families from the fortified positions when the security of the latter was endangered. With the aid of donkeys and pack bullocks the Persians brought to us flour, barley and food over the defiles after the fall of Geok Tepé. In this way the builders of the railway were obliged at first to restrict themselves to pack animals for the transport of the railway material. But this was soon set right by the railway itself and by the use of small tramways (of the Decauvill system) which were removed and put down wherever required. At the same time 700 single draught carts were obtained and placed at the disposal of the railway, 400 of which were drawn by horses and 300 by camels. These had a Military organization: they were subdivided and placed under Military men. They regularly followed the works and were always the evening before on the spot whence the labor was to commence the next day. Roads to connect the principal stations were also taken in hand, in consequence of which there are already several roads which connect Persia with the stations on the line. Lately, a small tramway to connect Askabad with Meshed is under consideration. The second great obstacle in the construction was the total absence of water for long distances, especially in the desert as far as the oasis. Every station is now supplied with a sufficient quantity of water which meets the wants not only of the people living at the station but also of the engines. At several places it has been found necessary to sink artesian wells, especially in the desert between the Caspian and Akal-Tekke oasis and between Merv and Amu Daria. Where the railway does not run at a considerable distance from the mountain ranges, the latter have been tapped and the water is conveyed by means of conduits to the stations, the height of the fall (of water) fulfilling the double purpose of filling the reservoirs as also of working fountains. There is nothing which has impressed upon the Mahomedans so much and afforded them at the same time so much pleasure as the erection of such water basins with the fountains playing in the middle in places which were hitherto waterless. Asiatics may be said to worship water which is a life preserver in the desert and which is so indispensably necessary for all their religious ceremonies. It can thus be readily understood with what delight they welcome the presence of water at these stations. It is not too much to say that the above more than anything else has given them a conception of our power and has made them welcome our rule. The third source from which water has been obtained is from the large rivers from which it is conducted where required by means of canals or pipes. The way in which we have overcome this and all other difficulties has inspired the natives with unlimited confidence in our resources, and thus it is that the inhabitants now call upon Russia for assistance against the sand-drifts, against which for want of energy and technical appliances they find themselves helpless. In this respect great distress prevails, for a part of Bokhara has already been threatened by it. The railway itself had many difficulties to contend with to overcome this obstacle, as at several points its course lay through such sandy districts. The worst of them was met in the first part of the railway to Molla Kari where the country may be said to consist of nothing else but sand-hills. This was also the case on the new line between Michaelovsk and Uzun-Ada, then again between Askabad and Géurs, and between Tedsche and Merv. It thus extended over many versts, and out of 1000 versts of the line, 300 may be said to be of this description. When in 1880 the line was constructed at Michael Bay it was found that the sand-drifts had during one night, entirely destroyed the work done and it was feared whether the whole work would not prove an illusion. This difficulty was got over by mixing the sea water with clay and some saline matter in which the soil abounds and working the mixture into the sand until sufficient consistency was obtained to allow of the rails being laid down. This improvised method has proved itself so efficient that even now after 6 years' use the line is perfectly firm and substantial, and no renovations are found necessary. It is resorted to wherever required. Of course this measure required in relatively close proximity the materials *viz.*, water, clay and saline matter. For the distance between Merv and Charjui another mode had therefore to be adopted. Here, branches of Saxaul (Ammodendron halexylon) were laid in the sand in the manner of fascines supplemented where necessary by shingle trellises such as are generally used in Russia against snow-drifts. The most effectual way, however, has always been found to consist in planting and sowing anything that will grow in the sand. It was thus found specially advantageous to plant Saxaul shrubs which is indigenous to the country and the Tamarisk, also to sow wild oats and grass of

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THE TRANS-CASPIAN MILITARY RAILWAY,

By Dr. O. Heyfeldir, Councillor, St Petersburg, and formerly Chief Medical Officer of Skobeleff's Akhal-Tekke Expedition ;

TRANSLATED FROM,

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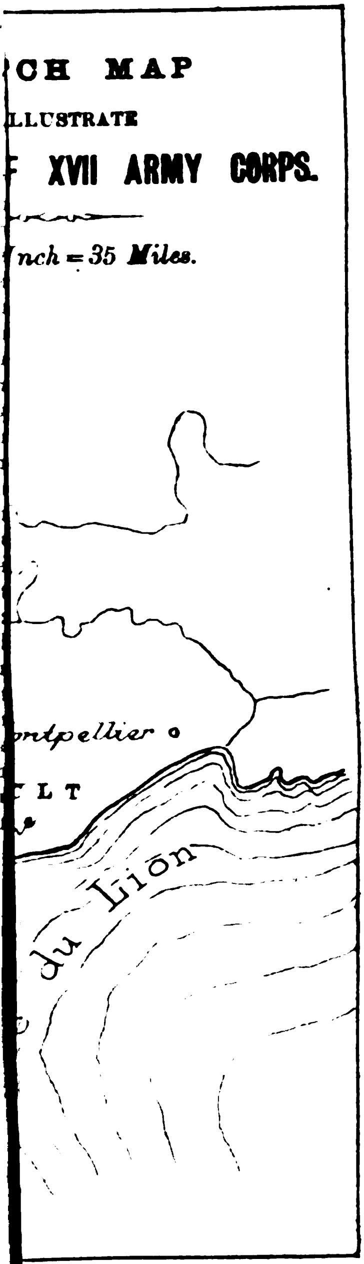
similar description. Of course the time has been too short to show any tangible results; but much may be expected from the growth of all plants, trees and shrubs all over the country along the railway line, on the boundaries of the oasis and along the rivers and ranges of mountains. Thus, much protection will be afforded against sand shifts and a general improvement in the conditions of life and climate will be the result. Tree nurseries have been established at Kasan-Dschik, Kizil-Arvat, Askabad and Usun-Ssu, where about 5 millions young trees have been planted. Besides these, most of the stations have already trees growing, and gardens and arbors. For special feverish places, such as Artschmana, Geok Teppe, and Pendsche I would recommend the Eucalyptus Globulus, and for places where there is abundance of water the Plane tree. The first for the improvement of malaria stricken places: the latter for the ample shade it provides and for its quick growing properties. Testimony of the latter is afforded by the glorious and famous Plane trees near Elisabethpol and Akstapha, where under extensive branches of these trees whole caravans find shelter and comfort. Finally, a tremendous difficulty which the railway had to contend with was the entire absence of fuel of any kind. Forests do not exist there. Coal mines although supposed to be there have not as yet been discovered. Consequently, Baku with its immense treasures of petroleum became at once of the greatest importance. As in Russia and on several American lines, the engines of the Caspian Railway are fed with the residue of naphtha. For the railway at large the opening of the oil-wells at Balla-Ischem and their connection with the railway by tram became of great importance. At present these indigenous petroleum wells supply the whole Caspian Railway with fuel. For the engines as well as the stoves and fireplaces at the stations nothing but naphtha is used. The winter in Trans-Caspia, although of short duration, is very severe, in proof of which it may be stated that in 1885-86 the the thermometer showed 22°. In 1886, it was of such severity that the Bay was frozen up. For this reason the question of fuel material and the mode of using it became one of serious consideration. The constructor of the railway therefore offered in the winter before last a large prize for the best construction of a stove adapted for naphtha residuum. The Nikitia system was found to be the best and adopted. We shall now return once more to the statement which we have already made that the Trans-Caspian Military Railway was constructed extremely cheap in spite of the celerity with which the work was carried on and its distance from the civilized world. The cost amounted to only 18,000 roubles per verst without rails or rolling stock: inclusive of the latter 32,000 roubles per verst; consequently, ten times cheaper than all the other Russian railways and cheaper than the English railways in India and the French railways in Africa. When railways are built merely to meet strategical purposes, this cheapness undoubtedly becomes most valuable, and this line can be held up as an example. This cheapness was due to little or no money having to be paid for the ground, absence of tunneling and to the restrictions imposed in the erection of public buildings which enjoined bare necessities and avoided luxury and elaborate details. The strategical strength which our Russian position has obtained by means of the railway does not alone consist in the fact that our garrisons have been placed at very advanced points thereby and that there is a railway at the disposal of the war ministry by which troops can be sent close to Herat, up to the Oxus, to Bokhara and Samarcand, but also that by the connection with the fleet on the Amu-Daria our power has been extended right into Badakshan, and that we thus threaten the passes to India as well as the English vassal in Afghanistan. Turkestan is thus connected with Trans-Caspia, and it is anticipated that before very long the administrative as well as the military organization of both the countries will be amalgamated. The railway consists at present of a single line, which however should it be found necessary, can be turned into a double one the moment the order to carry it out is received. We are thus in a position to send large masses of troops either from Astrakhan, or by way of Odessa, or from the Caucasas in the shortest possible time to Merv and the Afghan frontier. The railway possesses at present 80 engines, 1,000 wagons and 500 platform wagons which could all be used for the transport of troops. The line moreover, is level and almost free from gradients, and therefore heavy and long trains can be moved on it with ease. All the stations have now sufficient water to enable each station to supply daily 12 trains each of 45 wagons. This calculation not only includes the requirement of engines but also that of the men and horses the trains can accommodate. This shows that a Division or Army Corps can be moved to any point by the railway in a relatively short time. The whole of Trans-Caucasia has a Military Organization with officers at its head. The Head Quarters of the chief of all troops are at Merv, but there are garrisons at Krasnovodsk, Uzun-Ada. Kizil-Arvat, Geok Teppé, Askabad, Kachki and Pendsche. The troops consists of lately formed Trans-Caspian Fusilier Battalions, the two Railway Battalions, Artillery, a few Cossack Regiments, and the Militia organized from the Tekke-Turcomans, who are easily instructed and make good soldiers. It is entirely owing to the railway that it is found feasible to locate such a large military force in Trans-Caspia. By its means any movement required at any time of the year can be carried out. Each place has received the conditions necessary for existence and maintenance of a large number of people. Even the requirements of civilizatiou are no longer excluded from the country. In spite of its military organization particular attention is paid in the construction of the Trans-Caspian Railway to special oriental customs. Pilgrims are already coming in large numbers to undertake voyages from the Caspian to Persia, as they have found that by this route they arrive much quicker at the end of their journey. For, leaving the railway either at Askabad or Duschak they have only to travel 250 and 150 versts, respectively, to reach Meshed and for this purpose good roads have been constructed. The administration does not find it troublesome to proclaim to the natives the advantages to be gained by the railway, and pamphlets in the Persian language on the subject have been circulated in large numbers. It is believed [illegible] through this measure they have taken so readily to the railway. Attention has, moreover, been paid to the manners and customs [illegible] country. Thus, there are separate wagons for men and women; they are carpeted, so that the people can squat down in accordance with their habits, and even say their prayers when they like.

We wish now to say a few words as regards the commercial importance of the railway. All the goods from Bokhara and Turkestan, Khiva and Samarkand, especially cotton, wool and [illegible] have left their former routes via Orenburg and Persia for the railway. By the Amu Daria or by the old caravan routes now [illegible] they travel to Charjui, Merv and Askabad, which places have, in consequence, risen to considerable importance. Russian goods and stores are naturally sold at all stations. It may be assumed that the railway will form the principal route for trade between Central Asia and Europe. Moreover the direct consequence of the railway has already been felt in the transformation of the character of the people. The Tekke Turcomans, who formerly lived by robbery and plunder have, by the money they have earned in the construction of the railway, been transformed into peaceable people who have learnt to earn their livelihood by steady labour. They, moreover, have come to understand that their possession and labour [illegible] peasants have gained [illegible] which [illegible] pay attention to agriculture. Thus have the conquerors carried [illegible] good [illegible] of their [illegible], and there can be no doubt that [illegible] the State [illegible] to prosperity [illegible] [illegible] garrisoned. [illegible] Asia. [illegible] railway [illegible] must be regarded as [illegible] which will revolutionise the plan of [illegible] campaign in inhospitable countries.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LLUSTRATE
F XVII ARMY CORPS.
nch = 35 Miles.
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UNIV OF MICH.

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LLUSTRATE
F XVII ARMY CORPS.
nch = 35 Miles.
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MOBILIZATION OF THE 17TH FRENCH ARMY CORPS.

By Colonel W. Luckhardt, C.B., A.D.C.

The following particulars regarding the mobilization of the 17th French Army Corps are taken from German papers, and may be found to be of interest, as they throw considerable light on the general arrangements which now exist in the French army with regard to mobilization. The present trial was made to ascertain whether men, horses and other materials would be forthcoming to the extent calculated upon, and whether the army corps could be fitted out within the time allowed. The practical results have replied to the above queries in the affirmative. The only doubts which arise with regard to the results are, whether the success obtained is not due to a special preparation. To judge from a partial mobilization as the one under notice how the whole or general could be workėd out, it seems decidedly necessary that such a mobilization should be carried out without any previous preparations. Had consequently the experiment been made suddenly on a given date, it would more assuredly have approached reality. It is obvious that the attention which it is feasible to pay to an army corps becomes an impossibility when the whole army is ordered to be mobilized, and more especially when the circumstances of the case are such as to enforce immediate action. This stringent rule was apparently not observed, for we perceive from the papers that, while the mobilization was only intimated to the communities of the 17th Region on the 30th August by means of public placards, the fact that this day had been fixed upon was generally known in Berlin as early as the 26th idem owing to the untimely publication of the fact in the French paper "Figaro," which somehow appears to have obtained this information from the War Office. In pursuance of the notice given in the placards every man in reserve is directed to join at once the corps or regiment which is fixed on the last page of his military pocket-book. Similarly every owner of horse, wagon and mule which have been determined as fit for service in the Municipal lists is directed to take them to the place appointed for the purpose. Here committees, consisting jointly of military and civil officers, assemble to inspect them once more for the purpose of ascertaining that they are really fit for, at least a three-weeks campaign. The 17th Army Corps is formed in the 17th Region, which is composed of the departments of Haute-Garonne, Ariège, Tarn-et-Garonne, Gers, Lot-et-Garonne and Lot. European France is divided into eighteen regions, and each region forms an army corps; but, although the regions and army corps thus coincide in number, it is not arranged that the army corps should draw its recruits from the corresponding region. It will thus be seen that the organisation of the active army is not founded on a geographical basis, and hence in France there are no territorial regiments such as Burgandian, Normanic, Bretonic, &c. But, on the other hand, the recruits are distributed amongst the different corps without any such consideration. The consequence of this is that a soldier generally does not join his regiment again after his separation from it at the end of his term, but as long as he is liable to be called in, or in other words while he belongs to the reserve of the active army, he is appointed to the army corps which represents the region in which he has elected to reside. It is different in the territorial army, which is entirely composed of territorial regiments. Nevertheless these latter have only numbers and no territorial designation. The territorial army, it may be here remarked, is a kind of reserve army which is only called out in a case when the active army is found insufficient. Every region is divided into eight districts, called sub-divisions, for the purpose of recruiting, control of soldiers on leave and general mobilization purposes. The local military departments which administer these districts are designated "bureaux de recrutement, de mobilisation et de réquisition." In the principal town of the district the depôt of one active and one territorial regiment of the region is located. The most important town in the district of the 17th Region is Toulouse. Here are located the staff of the army corps, the 34th Infantry Division, the 67th Infantry Brigade and the 17th Artillery Brigade, the 83rd and 126th Infantry Regiments, as well as the 18th and 23rd Artillery Regiments, and several of the army departments. Besides Toulouse, which thus forms the capital of the department of Haute-Garonne, there is another smaller town in this district, St. Gaudens, and here in peace time the depôt of the 83rd Infantry Regiment, which is garrisoned in Toulouse, is located. In the department of Ariège there is only the small town of Foix with the depôt of the 59th Infantry Regiment, which latter garrisons Pamiers, a town situated a few miles north. In the department of Gers we have the little town Mirande, which is the place of a sub-division, with the depôt of the 88th Infantry Regiment. This regiment as well as the 68th Infantry Brigade, in which is included the 59th Regiment, are in garrison in the principal town of the department, *viz.*, Auch, in which also the 9th Regiment of Mounted Rifles is located. The three departments, Haute-Garonne, Ariège and Gers, form therefore the territory for the mobilization of the 34th Infantry Division. The second division of the corps, namely the 33rd, is garrisoned in Montauban, the principal town of the department Tarn-et-Garonne, which forms at the same time the location of a sub-division. There are in garrison in Montauban two infantry regiments of the division, *viz.*, the 20th and 11th, which, however, belong to different brigades, and the staff officers of the 17th Cavalry Brigade, as well as the 10th Cavalry Regiment of Dragoons, appertaining to the latter brigade. To the 33rd Division also belongs the 65th Infantry Brigade, which is located in Agen on the Garonne, the principal place of the department Lot-et-Garonne, which forms at the same time the location of a sub-division. The 9th Infantry Regiment, which belongs to the above brigade, is also posted here, while the 20th Infantry Regiment, which is comprised in the above brigade, and which is in garrison in Montauban, has its depôt in the second sub-division of the department in the town of Marmande. The 66th Infantry Brigade, together with the 7th Infantry Regiment, is in garrison in Cahors, the principal town of the department Lot. To this brigade belongs the 11th Infantry Regiment, which is in garrison in Montauban. There are further belonging to the corps the 29th Rifle Battalion, which has its depôt in Castelsarazin, but which is serving at present in Tunis ; the 17th Battalion of Engineers, which forms a part of the 2nd Engineer Regiment and which is located in Montpellier, the principal town of the 16th Region ; and the 17th Squadron of Military Train, located in Montauban.

We shall now discuss the different railways within this region. This point is of utmost importance, as it is the railway which enables the reserve men and horses to be speedily collected at their respective destinations, and thus facilitates the concentration of the corps. The whole length of the region is traversed by the Southern Railway Bordeaux-Narbonne, which runs up to Toulouse parallel to the river Garonne. This railway touches the district towns Marmande, Agen, Montauban, Toulouse, and also the towns of Castelnandary and Carcassonne. The region is further crossed in the west by the lines Périgueux-Agen of the Orleans Railway and Agen-Tarbes of the Southern Railway. Toulouse finally is the terminus of the line Paris-Orleans-Toulouse of the Orleans Railway, from which a 66-kilometre branch line diverges from Texos to Montauban. Although the lines mentioned above are constructed for development of commerce and the national prosperity of the country, and therefore do not owe their origin to strategical considerations, yet their number is sufficiently available to obtain a quick mobilization and concentration of the corps. They are in fact so complete that no reserve man requires more than an ordinary day's march to reach one of the stations from which the railway will carry him to his destination.

We shall now leave alone the details of the mobilization and consider the corps after its concentration. The Cavalry Brigade, consisting of the Dragoons and Mounted Rifles, will naturally form the veil to cover the remainder of the corps. The defensive power of this cavalry brigade can be strengthened by attaching to it one of the horse artillery batteries of the corps artillery. The support which the Rifle Battalion could afford falls away in the present instance, as, as already stated, it serves in Tunis. The necessary Commissariat and Sanitary detachments, the latter complete with its ambulance wagons, are attached to this brigade. The principal fighting strength of the army corps consists in the two infantry divisions. The only difference from the German organisation which we observe here is, that no permanent body of cavalry is attached to these divisions, and that they have no engineer train carrying pontoons, &c., attached to them. The staff for the division is fixed on a liberal scale, especially with reference to the representatives of artillery and engineers. An officer with twenty-five troopers is told off as permanent escort of the staff. There are also the necessary commissariat, field treasury and post, as well as an infantry and artillery ammunition column, a commissariat train of 146 wagons and a well-equipped hospital train. Compared with German arrangements the mode in which the above matters are provided for is certainly superior. But, on the other hand, it is argued that these appendages interfere to a certain extent with the mobility of the division. In Germany they are attached to the army corps and not to divisions. The infantry divisions consist, as we have mentioned already, of two infantry brigades each, and each infantry brigade consists of two infantry regiments. Each division has, besides, four field batteries of artillery and one company of engineers attached to it. Under the corps command direct are placed the Rifle Battalion, which of course, as shown above, is absent, the corps of artillery, which comprises one division of four field batteries and another of two field and two horse artillery batteries, as well as two artillery ammunition columns, the 3rd Company of Engineers with engineer park, the Pontonnier Company with a pontoon train for a bridge 124 metres in length, the Telegraph Section and a section of railway troops. The army corps also comprises an artillery park, consisting of three mixed ammunition columns and a joint column of ammunition and artificers, sanitary detachments, six field hospitals, principal supply column, a reserve supply column, a mobile clothing depôt, a mobile horse depôt, a field bakery column and a police detachment. The staff is also liberally supplied, and an escort, consisting of three officers and 56 troopers, is attached to it. There is further the Artillery staff, the Engineer staff, the Field Commissariat staff, the Medical and Veterinary staff, the joint division of the Treasury and Field Post. The mobilization of the territorial troops, of which the region is to supply an army corps in case of war, has not been carried out in the present instance, and the experimental mobilization is, therefore, not a complete one, as troops of the above description would form an important part of the army which France has naturally to reckon upon in case of war.

EXTRACT FROM THE GERMAN FIELD SERVICE REGULATIONS, PART I.

K.—Supply of Ammunition.

General Observations.

313. The failure of ammunition robs the infantry of the most potent factor of its strength for action. For the artillery it means that the arm is rendered temporarily entirely useless.

The timely replacement of expended ammunition during and after an action is, therefore, an important duty of leaders of troops of all ranks.

No means should be left untried to bring up ammunition to the troops during an action and so to keep up their fire, on the maintenance or extinction of which the fate of the day may depend.

314. When an important action is to be expected, or is being developed, the higher leaders must cause the ammunition columns to close up to the front and bring a portion of them up on the battle-field itself. They have also to acquaint the troops in action of the position of those columns or of advanced portions of the same.

Ammunition wagons sent forward from the columns, form the first ammunition reserve for the troops engaged. If such have not been sent up, the leaders of these troops will do well to procure a reserve for themselves out of the ammunition wagons of those units which are not engaged.

Infantry and Rifles.

315. The pouch ammunition is replaced during an action from the ammunition wagons.* These, under command of a mounted man, take up a covered position at the beginning of an action, if possible not further than 880 yards from the troops engaged, but in case of necessity they may be brought into the shooting line without regard to losses.

Men are employed in each company to bring up ammunition as required. On receiving their orders these men go to the wagons and receive from the commander of the same made-up packages,† with which they return to their company.

Ammunition wagons are bound to supply ammunition to men of any corps requiring it, without regard to the unit to which they themselves belong.

316. Every reinforcement for the shooting line has to bring forward with it a supply of ammunition for the men already engaged.

It is also of importance to take away the ammunition from the dead and wounded.

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* Till company ammunition wagons are introduced the infantry will draw their first supply from the battalion ammunition wagons.

† The made-up packages are to be so packed in ammunition boxes that after the bundles have been strapped together two men can carry the whole contents of a box (460 and 500 cartridges).

Leaders of all ranks and men must replace their ammunition on all possible opportunities without waiting for special orders.

317. There can be no question of only replacing ammunition up to the regulation supply In an action, whatever ammunition is to be had, it must be divided among the men and carried by them in their havresacks, or coat, or trouser pockets.

318. If a defensive action is being fought, especially in a previously-prepared position, boxes of ammunition or other recipients filled with cartridges are to be distributed along the shooting line.

319. If for any cause the ammunition wagons cannot follow the troops, their contents should be wholly or partially distributed among the men while going into action.

320. It is the duty of battalion commanders to take all measures for the timely replacement of ammunition expended from the ammunition wagons.

On a report being received of the wagons being emptied, if not earlier, on their own initiative, higher commanders will send forward single wagons from the ammunition columns to take the place of the empty ones, or, if the columns have not yet come up, they will use the ammunition wagons of the troops held in reserve.

It may, however, be perhaps better to fill up the emptied wagons with filled boxes from the wagons of the columns.

321. After an action the pouch ammunition will be at once completed from the ammunition wagons,* which will return to the infantry ammunition columns to fill up.

Cavalry and Pioneers.

322. The cavalry divisions have with them special cavalry ammunition wagons, which are attached to one of the horse artillery batteries.

323. If during an action cavalry or pioneers require to replenish their ammunition, they may draw upon the nearest infantry ammunition wagons, and, after the action, on the nearest infantry ammunition column.

324. A reserve of revolver ammunition is carried in the regimental ammunition wagons and in the infantry ammunition columns.

Artillery.

325. The first echelon of wagons† of the batteries remain in touch with the guns and follow them immediately into action. The second echelon of wagons takes up a position covered as far as possible but easily accessible, about 880 yards in rear of that of the battery, leaving the roads free.

If the second echelon of wagons of several batteries are united, the officer in charge of them has so far to keep up communication with the batteries in the column in front that he is acquainted with their whereabouts. If the batteries advance during the action it is the duty of this officer to bring the second echelon forward in good time, for which duty great care and energy are often required.

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* As long as ammunition is carried on the company baggage wagons this supply is drawn from them.

† Three ammunition and one store wagons.—J. M. G.

326. As a rule the replenishment of ammunition, even when their second echelons of wagons are united by *abthielungen*,* is the affair of individual batteries. The limber ammunition is replenished from the wagons of the first echelon whenever opportunity offers, but at the latest when half of the limber ammunition is expended.

Whenever the circumstances of the action permit it is advisable to fire away the ammunition direct from the wagons of the first echelon and, for this purpose, to bring the wagons of the latter right up to the guns, keeping the limber ammunition intact as long as possible.

Empty wagons of the first echelon are sent at once at a trot back to the second echelon, from which full wagons are sent up to take their place.

327. The empty battery ammunition wagons are filled up from the nearest ammunition columns on the field.

If the situation requires haste, filled wagons from the columns may exceptionally be handed over temporarily to the batteries.

H. A. S.

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* We have no word for this. It means a group of three or four batteries under a field officer.—J. M. G.

EXTRACT FROM VARIOUS REGULATIONS, INSTRUCTIONS AND ORDERS OF THE RUSSIAN ARMY.

I.—From the Regulations for the first line of Infantry in battle.

Movement in extended order to the attack.

253. The attack in line, will be carried out, by marching or doubling, from one position to another by the whole line or by fractions of it, in the latter case the forward movement of one part should be protected by the fire of another.

254. For an attack in quick time the commander of the fighting line gives the signal whistle, and the command "*Line Advance,*" *No. Section. (Company) will direct.* The section commanders, repeat the first order; and indicate the direction, being guided by the rule laid down in section 243. On this order, the men slope arms, and move forward freely, not troubling about keeping step or preserving a well-dressed line, but keeping steadily in the direction pointed out, (on some visible object) regulating their advance by that of the directing fraction. In other respects, the section commanders and isolated leaders should keep an eye to the due maintenance of the connection with the directing fraction.

Note—If during this movement it is necessary to commence firing the men should halt and then fire.

255. In order to carry out a movement at the double by the whole line, the commander of the fighting line gives the signal whistle and the command "*The Line will advance at the double,*" at the same time sending intimation of this order to those sections who cannot hear his command. The section commanders repeat the whistle and give the order "*Cease firing*" (if the men are firing) and "*Extract cartridges.*" The section commanders then move to the front and order "*Rise up-Double.*" The men having risen move forward at the double, until halted by the commander of the fighting line, according to the instructions given below in para. 260. The section commanders move in front of their sections.

256. In order to carry out the advance at the double, by sections of the line, the commander of the fighting line gives the order. "*Advance by sections..................sections commencing.*" On this command the line doubles forward to a new position in two rushes, those sections commencing which were ordered to begin the advance, and then, when the first rush is finished, and fire opened, the remaining sections of the line. The orders regarding this movement are those contained in the following paragraph.

257. Until the first double by each portion in turn is finished, the commander of the fighting line continues to lead it, moving in front, until the line approaches within such a distance of the point designated for the attack, that perhaps it may be possible to initiate a forward movement for an assault with the bayonet. It is left to the commander of the fighting line to detain in each position in which the whole line has assembled, as many men as he considers necessary, nominating by order, each time, the sections which are to commence the next rush.

258. During the advance at the double the following rules are to be observed. (1) The men to carry their arms at the order. (2) The longest rush not to exceed 100 paces. (3) Rushes to be executed by units of not less than a section. (4) The sections advancing, should not cover the front of the sections which remain in position, (5) Having reached their position, the sections in front, at the moment of the advance of other sections, increase their fire by order of the section commanders.

259. On the advance of the fighting line, the reserve also moves forward, regulating its movements by the general advance, and either marching or doubling. It need not follow each double of the fighting line, but should move forward as occasion offers, keeping always in view its relative distance from the fighting line.

260. To halt the fighting line, the commander gives the signal whistle and the command '*Line Halt.*' The section commanders having repeated the command, the line halts. During the movement at the Double, on the command '*Line Halt*' those portions which have not yet carried out the last rush will double up into line before halting by order of the section commanders, and will then cease their advance.

Assault with the bayonet.

270. A bayonet attack will be carried out either by the fighting line alone, or by the fighting line and reserve combined.

271. In order to carry it out by the line alone, the commander forewarns all the subordinate commanders in the line, and subsequently gives the signal whistle and the command "*Line Advance.*" On the repetition of this order by the section commanders, the men cease firing, march rapidly forward and when they have approached to within about 50 paces of their objective point, the commander of the fighting line gives the word '*Hurrah,*' after which the men closing in towards their various leaders and section commanders rush forward at the double with cries of "*Hurrah.*" During this time, the reserve follows the fighting line without halting. If only a part of the line is ordered to carry out the afore-mentioned movements, the other part remaining in its position maintains from the beginning the heaviest possible fire.

272. The assault with the bayonet by the fighting line, together with the reserve, is carried out in the following manner. Having approached the objective point to within a certain distance, which possibly has already been reached without halting, *i.e.* about 200 paces (last

position), the fighting line is halted, and opens the heaviest possible fire, under cover of which the reserve moves up to the fighting line at an accelerated pace in extended order. When it arrives close to the fighting line the company commander gives the signal to attack. The drummers beat the charge, the buglers sound the advance, and the reserve steps out, closing on the march. The fighting line should be some paces in front of the reserve aiding the attack by a heavy independent fire. Having arrived within 50 paces of the objective point, the company commander shouts 'Hurrah,' on which the fighting line ceases firing, closes in towards its various leaders, and together with the reserve, rushes rapidly forward. If the signal to charge, is given by the company commander before the reserve has drawn sufficiently near the fighting line, the commander of the reserve, takes it as a warning only and orders the drummers to beat the charge when the reserve has approached close to the fighting line.

273. Having once moved forward for an assault with the bayonet, it is necessary to go straight and rapidly towards the objective point, not halting until the object of the assault is attained.

II.—FROM THE INSTRUCTIONS FOR THE MOVEMENTS OF COMPANIES AND BATTALIONS, IN ACTION.

Advance in attacking formation towards the enemy's position.

27. When the attacking formation is assumed which is done, on coming under the enemy's fire, i.e. at a distance from him of one to two versts, (1200 to 2400 yards) the further movement towards the enemy's position as regards the formations, and the nature of the advance may be divided into two parts.

I.—The advance under fire.
II.—The attack.

28. The period, from the assumption of the fighting formation, up to the entrance into the zone of aimed musketry fire, i.e. approximately 800 paces, may be called "The advance under fire". The movement is carried out by the whole front of attack in quick time, and is begun under cover of a chain of scouts. Approximately at 2000 paces from the enemy, the fighting line is sent forward, and the advance is continued, as much as possible without halting, by the whole line, moving according to the rules given in sections 254, 259 and 260 of the Regulations. Halts are made only in order to fire, and only by that portion of the fighting line to which a good object for their fire is presented.

29. In drawing near the enemy, for instance at about 800 paces, the further advance will have for its object the attack of the opponent's position. Before commencing this movement, the commander ought to make himself acquainted in detail with the dispositions of the antagonist, and arrange finally the plan of attack; to reinforce the fighting line and fill up the expended cartridges if there is any necessity for doing so; and to give to all parts of the force the right direction. All this demands a halt of more or less duration,

257. Until the first double by each portion in turn is finished the commander of the fighting line continues to lead it, moving [illegible] until the line approaches within such a distance of the point designated for the attack, that perhaps it may be possible to [illegible] a forward movement for an assault with the bayonet. It is left to the commander of the fighting line to detain in each position in which the whole line has assembled as many men as he considers necessary, nominating by order, each time, the sections which are to execute the next rush.

258. During the advance at the double the following rules are to be observed: (1) The men to carry their arms at the order. (2) The longest rush not to exceed 100 paces. (3) Rushes to be executed by units of not less than a section. (4) The sections advancing should not cover the front of the sections which remain in position. (5) Having reached their position, the sections in front, at the moment of the advance of other sections, increase their fire by order of the section commanders.

259. On the advance of the fighting line, the reserve also moves forward regulating its movements by the general advance, and either marching or doubling. It need not follow each double of the fighting line, but should move forward as occasion offers, keeping always in view its relative distance from the fighting line.

260. To halt the fighting line, the commander gives the signal whistle and the command *Line Halt*. The section commanders having repeated the command, the line halts. During the movement at the double, on the command *Line Halt* those portions which have not yet carried out the last rush will double up into line before halting by order of the section commanders, and will then cease their advance.

Assault with the Bayonet

270. A bayonet attack will be carried out either by the fighting line alone, or by the fighting line and reserve [illegible].

271. In order to carry it out by the line alone, the commander forewarns [illegible] the line, at [illegible] gives the signal [illegible] the command *Line Advance* [illegible] repetition of this order by the section commanders, the men cease firing, march [illegible] forward and when they have arrived within about [illegible] paces of the point, the commander of the fighting line gives the word *Hurrah*, after which the men [illegible] in towards [illegible] rush forward at the [illegible] with cheers of *Hurrah*. During this time, the reserve [illegible] without halting. If only a part of the line is ordered to carry out the above [illegible], the other part remaining in its position maintains from there [illegible] the heaviest possible fire.

272. The assault with the bayonet by the fighting line, together with the reserve, is carried out in the following manner: [illegible] has already been reached [illegible] paces [illegible]

position), the fighting line is halted, and opens the heaviest possible fire, under cover of which the reserve moves up to the fighting line at an accelerated pace in extended order. When it arrives close to the fighting line the company commander gives the signal to attack. The drummers beat the charge, the buglers sound the advance, and the reserve steps out, closing on the march. The fighting line should be some paces in front of the reserve aiding the attack by a heavy independent fire. Having arrived within 50 paces of the objective point, the company commander shouts 'Hurrah,' on which the fighting line ceases firing, closes in towards its various leaders, and together with the reserve, rushes rapidly forward. If the signal to charge, is given by the company commander before the reserve has drawn sufficiently near the fighting line, the commander of the reserve, takes it as a warning only and orders the drummers to beat the charge when the reserve has approached close to the fighting line.

273. Having once moved forward for an assault with the bayonet, it is necessary to go straight and rapidly towards the objective point, not halting until the object of the assault is attained.

II.—From the Instructions for the movements of companies and battalions, in action.

Advance in attacking formation towards the enemy's position.

27. When the attacking formation is assumed which is done, on coming under the enemy's fire, i.e. at a distance from him of one to two versts, (1200 to 2400 yards) the further movement towards the enemy's position as regards the formations, and the nature of the advance may be divided into two parts.

I.—The advance under fire.
II.—The attack.

28. The period, from the assumption of the fighting formation, up to the entrance into the zone of aimed musketry fire, i.e. approximately 800 paces, may be called "The advance under fire". The movement is carried out by the whole front of attack in quick time, and is begun under cover of a chain of scouts. Approximately at 2000 paces from the enemy, the fighting line is sent forward, and the advance is continued, as much as possible without halting, by the whole line, moving according to the rules given in sections 254, 259 and 260 of the Regulations. Halts are made only in order to fire, and only by that portion of the fighting line to which a good object for their fire is presented.

29. In drawing near the enemy, for instance at about 800 paces, the further advance will have for its object the attack of the opponent's position. Before commencing this movement, the commander ought to make himself acquainted in detail with the dispositions of the antagonist, and arrange finally the plan of attack; to reinforce the fighting line and fill up the expended cartridges if there is any necessity for doing so; and to give to all parts of the force the right direction. All this demands a halt of more or less duration,

during which the preparatory fire for the attack is commenced. The actual forward movement, up to the last firing position, is carried out by the various units in attacking formation and at the double, according to paras. 255-260 and 382-385.—The regulations and rules for the fighting line and the reserve are stated further on.

30. At a distance approximately, of from 300-150 paces from the enemy, or nearer according to the amount of cover, the last firing position is selected, from whence the bayonet attack is finally prepared by musketry fire. After this comes the advance for "An assault with the bayonet."

Movements of the Fighting Line.

31. As regards the movements of the fighting line, the following must be kept in view.

(*a.*) Taking every advantage of cover and of the undulations of the ground, the desired direction must at the same time be kept, and the men neither crowded nor scattered.

(*b.*) The fighting line of the neighbouring companies in accordance with para. 385, keeps touch to the flank nearest to the company of direction. This connection may be especially easily broken during the advance of the fighting line over close country (such as through a wood, clumps of bushes, standing corn and such like). To avoid this, in approaching such ground, preparations should be made to pass through it, for which it is necessary to halt for a time, and take measures for keeping up the connection throughout the line, which is attained, either by sending men into the fighting line to fill up the gaps which have occurred, it being understood that each man should be able to see the men on his right and left, or by sending into the intervals of the fighting line, separate detached parties.

(*c.*) If it should become necessary to change slightly the direction of the advance, it should be carried ont before the entry of the fighting line into the zone of the enemy's aimed musketry fire, *i. e.* at the commencement of the attack; as a change of direction afterwards, *i. e*, when the objective point is already in view, is not only accompanied with great loss but sometimes is impossible to carry out.

(*d.*) In the second period of the advance, *i. e.* from a distance of about 800 paces, in order to diminish the loss from the enemy's fire, and to shorten the time during which the men present a good mark for the enemy's shots; the advance over open spaces is carried out at the double, by the whole fighting line of the company or by portions of it, covering the double of one part, by the fire of the, other, remainiug in portion. But if the locality conceals the advancing portion of the company, it should advance to the next position in quick time; the distances to be traversed and the portions of the fighting line detailed to cross them, will be entirely dependent on the circumstances of the fight and of the locality.

(*e.*) Sometimes an occasion may present itself, to adopt the double at a long distance from the enemy, in order the more quickly to pass over a certain space exposed to heavy artillery fire, on such an occassion the whole fighting line advances together and at the same time.

(*f.*) For facilitating the advance of the fighting line, the advance of large portions of not less than a section is to be preferred, or, the company advances by half companies according to para. 216. The regulations as regards this are, that, if there are 3 sections in the fighting line, at first one section can double to the front and afterwards the two remaining sections either together or separately.

(*g.*) The advance, should be commenced by that portion of the fighting line, which has the most favourable position in front of it.—— Having observed beforehand the lie of the ground, the commander of the line, if the opportunity occurs, determines the new position to be occupied. But if in consequence of its being an open and level country, to indicate such a position is impossible, the Section Commanders, who at the moment of the advance, should in accordance with para. 255, find themselves in front of their sections will themselves select the halting place. They should endeavour to select the halting place away from objects, which affording hardly any or no cover, are yet useful to the enemy as giving a relative indication of the distance, such for instance, as scattered trees or posts, or some clumps of brushwood &c.

(*h.*) The length of the double, depends on the positions which present themselves but to avoid fatiguing the men, the double by para. 258 ought not to exceed 100 pacce and therefore if the next position, we will suppose, is at a distance of 200-300 paces, the fraction advancing should make one or two short halts on the road exclusively to breathe the men—fire is only to be opened after having occupied the desired position. The opening of fire from the new position, serves as an opportunity for the advance of those portions of the line which have remained in rear, and which, having doubled forward arrange themselves in conformity with those portions which have already occupied the position.

(*i.*) If the part of the line which has to advance is assembled in some sheltered spot, then when advancing it extends *en route* and does not move in a crowd but when any new sheltered spot presents itself—it again closes in.

(*j*) Sometimes, even at a short distance from the enemy, an opportunity may occur to make an advance of the whole line together, for instance, when the enemy is evidently disordered, and there is a diminution in his fire, or when perhaps, there is a fog, which momentarily thickening, prevents, for the moment, a good view &c.

Movements of the Reserves.

32. The company reserve, according to sections 232-250 of the Regulations should not be at a greater distance from its fighting line, than the distance between the fighting line and the enemy's position, not more than this distance should ever be between the company and battalion reserves; consequently according as the enemy is approached, the reserves also draw nearer to the fighting line. In the advance over close country, when it is difficult, if not impossible, to see those who are moving in front or on either hand, the connection between the sections in the fighting line may be easily broken; under these

circumstances the company and battalion reserves, ought to close in to such a distance, that those in rear can see those in front, in order that the fighting line may be watched from the company reserve, and this latter from the battalion reserve.

33. In adapting themselves to the ground, the reserves move as often as possible from one covered position to another although such a spot may be placed rather to one side but yet within the space belonging to that particular unit. When in movement, they select the road which affords the best cover from fire, for example slopes not exposed to artillery fire, hollows, and such like, but they must be careful ever to retain the power of giving timely support to the fighting line. When the fighting line commences the advance at the double, both the company and battalion reserves in, their own time, double forward in the same manner, not following without fail each advance of the fighting line, but selecting for their own advance the most favorable opportunity, for instance when it may happen that smoke or dust would conceal the movement or when the enemy's attention is distracted by something else, on such an occasion (as doubling wearies the men) the opportunity may be seized to push forward the reserve iu quick time and not at the double.

34. During their advance, the extent of front of the reserves should change continually, being entirely dependent on the ground; in advancing over open country, and exposed to fire, the front is extended by opening the files but on ground which offers cover to a considerable extent, the company reserves and the companies of the Battalion reserve are handier in column, because in this formation an advance can be carried out in the best order.

35. When the fighting line approaches the last position, about 150-300 paces from the enemy, the Company reserves ought to be not more than 200 paces from the fighting line, and if an opportunity occurs even nearer taking care however that the reserve is not mingled with the fighting line. The battalion reserves also draw nearer to the company reserves.

The Employment of the Reserves.

36 The reinforcement of the fighting line, is carried out before the advance to the attack, *i. e.* at a distance of about 800 paces from the enemy. The company reserves details another section for the reinforcement of the fighting line, or not, according to the orders of the company Commander.

When the company is acting separately, the reserve ought in any case, preserve at least one section up to the very end of the fight.

The companies of the battalion reserve themselves enter the front line according to para. 378, only on an occasion when the company reserves have already entirely joined the fighting line, but, as on all other occasions, this is carried out or not according to the orders of the battalion Commander. The only exception to this rule is, when there is extremely urgent need of help to the companies in front, and there is no time to ask for the orders of the battalion Commander. On such an occasion the commander of the company leading the battalion reserve must move forward his company in relief on his own personal responsibility, and immediately report having done so to the battalion commander. Having fulfilled his task if he does not receive any special orders from the battalion commander, he again resumes his place in the battalion reserve.

ASSAULT WITH THE BAYONET.

37. The action must generally end by an Assault with the Bayonet. The moment having arrived for the use of the bayonet, it is necessary to advance swiftly and directly towards the objective point, not halting until the object of the attack is attained, the slightest hesitation or indecision and so much the more any halt whatever may cause enormous loss, and have most disastrous consequences.

38. An assault with the bayonet, according to para. 270 of the Regulations may be carried out by the fighting line alone, or by the reserve together with the fighting line.

A.—By the Fighting Line.

In the last position (at 300-150 paces from the enemy), the fighting line increases its fire to the greatest possible extent. If at this time a decrease of the enemy's fire is remarked, or that he is preparing to abandon his position, in a word, if there appears the probability of a successful assault by the fighting line alone, it will attack the enemy with the bayonet, in the formation indicated in para. 271 of the Regulations, not awaiting the arrival of the Reserves. It may happen, that, during the advance there will be encountered isolated local objects occupied by the enemy's skirmishers from which they must be driven out. This can sometimes be accomplished by that part of the fighting line opposite which is the afore mentioned object, such a special attack with the bayonet, is to be supported by a heavy fire from the other parts of the line.

B.—By the assembled Sections.

In the case when, it is impossible to calculate on the certain success of an attack by the fighting line alone, the bayonet assault is to be delivered by the Fighting Line together with the Reserve

39. On the occasion of an attack with the bayonet across a ravine or a passage over a stream, the fighting line remains on its own bank and opens a heavy fire on the enemy; the reserve crosses the stream and attacks, or having descended into the ravine forms up and then rushes forward with the bayonet.

40. When the leading companies attack with the bayonet, the companies of the battalion reserve, continue their advance, either for the purpose of aiding the assaulting force, or of covering their retreat. If it should have happened that the company reserve has entirely joined the fighting line, the company of the battalion reserve nearest to it, takes on itself its duties.

41. On the occasion of an unsuccessful attack, the rescue of the advanced companies is the duty of the companies of the battalion reserve.

III.—FROM THE INSTRUCTIONS FOR THE MOVEMENT IN ACTION OF DETACHMENTS OF ALL THREE ARMS OF THE SERVICE.

The Advance and the Attack.

36, In this paragraph is stated the general movements of the Advance and of the Attack.

All given distances are to be regarded only as approximate, liable to be changed and entirely dependent on the ground, moreover the nature of the work itself may vary, for example, if the enemy is found unprepared for action, the attack may perhaps be made, without any preceding preparation by fire &c.

37. Artillery in its first position, approximately at 3000-2500 yards, opens fire, in order to provoke a reply from the enemy, and thus find out the disposition of his batteries. This period of the fight, when the infantry owing to its great distance from the enemy has not yet taken part in the work, is nothing more than a reconnaissance of the enemy's position. It is yet possible to take advantage of the information thus obtained, and to change if necessary the dispositions for the fight.

When the enemy's dispositions are sufficiently known, the commander of the force gives orders to the Detachments of the fighting line to begin the advance but the Artillery continues in action in its first position. If the Battalions of the first line are in columns of Companies at close interval they will move on in the same formation, having in front and on the outer flanks a line of scouts. The flanks should also be protected by Cavalry detachments specially detailed for the duty.

38. Approximately at 3000-2000 paces from the enemy a part of the first line halts, selecting for this purpose, a particularly well-covered position. The line of scouts is replaced by a fighting line. The Artlllery is called up to a second position approximately at 2100-1600 yards and opens fire in order to crush the enemy's batteries. When the objective point has been selected and the plan of attack worked out the batteries actually engaged are reinforced by Artillery from the reserve. The point selected for attack may be on the front of the position or on its flank. The artillery concentrates its fire on the point selected, on the troops defending it and also on the enemy's artillery who are firing on the approaches to it. When the commander of the force considers that the artillery fire has done its work, has sufficiently prepared, and has made possible the success of further operations, he gives orders to the first line to attack. The battalions of the first line advance being guided by paras. 27-35 of the "Instructions for the movements of companies and battalions in action." Especial attention is to be directed, to the strict maintenance of the given direction, and to the keeping up of the connection with the neighbouring detachments.

39. Having arrived within attacking distance, *i. e.* from 1000 to 800 paces from the enemy, the first line makes for the second

line, a general halt. During this halt, all measures necessary for securing the success of the attack, should be arranged and settled. A part of the troops from the general reserve, and also the Cavalry, may be despatched to surround the objective point, or to distract the attention of the enemy's reserves. The fighting line is strengthened, and having taken up a favourable position for firing on the enemy, opens a heavy fire on the troops, whom it is intended to attack. Under cover of this fire the batteries, which are occupying their second position, are called forward to a third position about 100 yards from the enemy, for immediate co-operation with the attacking troops. On such an occasion, the artillery will more advantageously occupy a position on the flank of those troops who are to lead the attack, provided that from such a position, the objective point can be well canonnaded. Generally, a flanking position for the batteries, with respect to the proposed direction of the attack, is more advantageous, than a frontal, because firstly, the artillery fire will not be so impeded, and secondly, it will not be so quickly blinded by the forward movements of the troops. Depending on the plan of attack, it may so happen that no necessity will arise for the whole of the first line to continue their advance, During the time when, a part of it, having been designated for the attack, is contiruing its forward movement, another part may receive orders to take up a favourable position, with the object of supporting the attacking force by a heavy fire, and of preventing its flanks from being turned. When the artillery has moved up to its last position, and opened fire, those portions of the force which have been detailed for the attack, continue their advance, as far as possible without halting. The reserves gradually close up, each reserve supporting its own particular unit. The main reserve follows the attacking force.

40. If at the closest possible distance from the enemy *i. e.* from 150-300 paces the fighting line is obliged, to halt it should develope its fire as much as possible, but in every case the reserve continue their advance without halting. The Artillery up to the last moment directs a heavy fire on the objective point. Sometimes an opportunity may offer itself, to bring the Artillery still closer. When the reserves arrive close to the fighting line, their drummers beat the "pas de charge" and a general advance takes place, for an assault with the bayonet. All troops arriving subsequently, follow the direction of the reserve, and at a distance of 300 paces from the objective point, their drums begin to beat the "pas de charge" and the troops continue their advance, either, to secure the success of the assault, or to reserve the attacking force and repeat the assault, when unsuccessful. If owing to the proximity of their own troops to those of the enemy it will not be possible for the Artillery, to continue its fire against the latter, it will direct its fire to the rear of the objective point and against the supposed position of the enemy's reserves, or against other parts of the enemy's position close to the objective point, or if, to do even this much is imposible, it should cease firing, and having resumed its previous formation, it should await the issue

of the attack, in order to continue its advance. The Cavalry having during the attack, made a demonstration, as if intending a turning movement, watches the outer flanks of the attacking force.

IV.—FROM THE INSTRUCTIONS FOR THE TACTICAL HANDLING OF FIELD ARTILLERY IN CONNECTION WITH THE OTHER ARMS OF THE SERVICE.

The Offensive.

The offensive, is usually commenced by an advanced guard action, which ceases at the first good position, on a level with which, all the first line of the main body is gradually formed up. The whole mass, of the Artillery, belonging to the Infantry Divisions, Composing the fighting line (excluding the batteries belonging to the divisional reserves) forms up, on a so called reconnoitring position, and opens fire, at a distance approximately of 2500-3000 yards form the enemys batteries, *i. e.* at the greatest distance, from which, an effective fire can be delivered, the artillery then selects the most prominent objects to fire on, endeavouring as much as possible, by its own fire to evoke that of the enemy, thoughout his whole line, and thus to disclose his dispositions. With this object, the artillery will in turn, concentrate its fire, against different parts of the enemy's positon. The advanced parties of Infantry, move forward with the artillery, and conform their movements to those of the guns. On the artillery opening fire from the long distance above mentioned, Infantry detachments do not yet commence their own fire, but do their utmost to gain and occupy, to the greatest advantage, the ground in front of the artillery. When the artillery by its fire, has goaded the enemy into a reply throughout the whole extent of his position, and by this means has brought out the strong and weak points of the ground occupied by him, and when the remainder of the attacking force has come up, and has had time, under cover of the artillery fire, to take up their appointed positions, the opportune moment will have come, for the whole line of artillery to advance nearer to the enemy, within the most effective range for artillery fire, *viz.* abont 1500-2000 yards from the enemy's batteries, in order finally to crush the fire of his artillery. To push forward the artillery line at once, nearer the 1500 yards, would not be always advantageous, seeing that by a further advance of 200 yards or even more, the efficacy of the fire would not be much increased, and on the other hand, the artillery would be exposed to the effects of a fairly heavy musketry fire, for it must be remembered, that the enemy's Infantry on the defensive, have always the power of advancing considerably in front of their own batteries. On the artillery moving into its new position, it is very advantageous for the batteries in action to be reinforced by the artillery of the divisional and corps reserves, if the ground and the other circumstances of the fight admit of this being done. This movement may be carried out in two ways; the batteries which are already firing at long range, advance first by echelons, into the new position and then the before—mentioned batteries of the reserves are added to them, or conversly, under cover of the fire of the batteries in action, the batteries of the divisional and corps reserve, push forward first, up to a distance of from 1500-2000 yards and then, under cover of their fire, all the batteries in rear gradually join them. The last way is to be preferred, as, with fresh batteries, which have not yet suffered from fire, the first advance, to a much nearer distance, is much more easy. Having drawn forward in this manner, a considerable mass of artillery, an endeavour should be made by an increased fire to overwhelm and destroy the enemy's artillery.

During the advance of the batteries, the foremost Infantry detachments, also increasingly push forward, conforming their movements to those of the guns and under no circumstances remaining in rear of them. As the enemy's artillery fire grows weaker, and when, from the nearer position, the general disposition of the enemy is more clearly ascertained and a point for a decisive attack finally chosen; the whole, or a large part of the field artillery, from the main reserve of the detachment, or army, should be pushed to the front, and open fire against the point thus chosen. This artillery advance from the reserve, up to the position which the batteries of the first line have already gained, (*i. e.* at a distance of from 1500-2000 yards from the enemy) and if possible even somewhat closer. The newly formed firing line of reserve artillery, ought to be so composed, as not only to complete the defeat of the artillery occupying the position to be attacked, but also to cause heavy loss to the Infantry occupying that place and even, to the Infantry, which will be despatched to its aid, from the enemy's reserves. The neighbouring batteries, among them, those which have been in action from the beginning of the fight also direct their fire, preferentially from a flank against the objective point; and if a possibility occurs open a heavy shrapnel fire on the enemy's reserves above-mentioned, who will be hastening to the help of the endangered point. During the decisive artillery duel, the Infantry of the main reserve, also draw closer to the artillery (which have been previously pushed to the front from this reserve) and await a favorable moment to advance. When the enemy's artillery and Infantry, fire from the position it is proposed to attack, has sufficiently diminished, the Infantry commence their advance, choosing, as far as possible, a direction which will not prevent the artillery from continuing in action. But as the Infantry will soon have the artillery considerably behind them; then, according to the orders of the officer who is directing the attack, the artillery (concentrating exclusively against the objective point, in order to give better support to the Infantry and to encourage it) advance as rapidly as possible, to a distance, of about 900 yards from the enemy's position and at once commence a rolling and continuous fire.

At this close distance, the artillery direct their principal attention to the enemy's Infantry, but as regards the enemy's artillery, it ought to continue to fire only on that part of it, which may be still causing some considerable loss to the advancing Infantry, but it ought to pay no attention, to that artillery which is is not firing on the Infantry. Meantime, the remainder of the artillery of the attack, disposed on other parts of the battlefield, particularly those portions of it nearest to the objective point, if, by the conditions of the fight it seems desirable, also advance gradually from the distance of 1500-2000 yards, to a much nearer distance, as much as possible, at the same time as the other troops, and according to the orders of the officer commanding the force; endeavours to help forward the success of the main attack. For this purpose, either a strong demonstration or even a false attack, is usually directed against some other portion of the enemy's position, with the object of drawing off a part of the enemy's force, from that part, of his position against which the real attack is to be directed. But the batteries nearest to the main attack, as at the previous distance direct the whole of their fire against all those portions of the enemy's force which are causing loss to the attacking troops. At this close distance, the opportunity may perhaps occur, by means of sharpnel or common shell, to cause heavy loss, to those of the enemy's troops, which are hastening forward from the reserves to the aid of the threatened point. The artillery at this period of the fight, should take no notice of the enemy's musketry fire, all its endeavours should be limited to one object, *viz* that of giving the most active help to its own Infantry,

In the meantime the attacking Infantry continues—as much as possible without hatling—its movement in advance of the artillery, (brought forward to a distance of about 900 yards), and moves straight towards the objective point, now selecting for itself the most suitable road. At this period, the duty of the artillery is to conform to the movement and action of the Infantry, and not, in any case, to impede its acting, in such a manner as it may find most convenient. With this object, the batteries continue in action up to the last moment possible. Even if the advancing Infantry, prevents its own artillery from seeing, this latter, if it is possible, particularly when the enemy is occupying elevated ground, may fire common shell over the heads of their own troops. Such a fire, may greatly contribute to the success of the assault. In such cases, shrapnel fire is impossible as with this nature of fire, the premature explosions which may occur, always produce a pernicious effect on the troops, at the very moment, when, on the contray it is necessary by all means, to raise the spirits of the storming columns. In the meantime, under favorable conditions, a part of the artillery, ought to advance still nearer, and as far as possible fire case. This may greatly flurry the enemy, and in any case, always raises the spirits of the advancing Infantry, at the most critical time. Finally, if the attack is successful, such a forward movement, gives the power of more rapidly occupying with artillery the enemys position, and of pursuing the retreating foe with fire. By acting thus, the artillery may certainly suffer great loss both in men and horses but this should not deter it. At the decisive moment of the fight, each branch of the service, ought to sacrifice itself, if by such means only, is it possible, to gain the victory. If it is not possible, for the artillery to advance nearer to the enemy than 900 yards, then, in every case after ceasing fire, owing to the impossibility of firing at the moment of the assault, a part of it, most certainly ought quickly to advance up to the attacking troops, but not move beyond them. If the attack is successful, these batteries immediately occupy the enemy's position, and open fire on the defeated foe. If the attack is repulsed, these batteries immediately move to the front, and open a close fire, to check, although only for a short time, the enemy, and thus to enable, their own Infantry to retreat. At the same time, the artillery, which had continued in action, at about 900 yards range, also opens fire as soon as possible, and offers to the retreating Infantry, the first safe position for reforming its ranks. If after a successful attack, the defeated foe halts on a second position selected beforehand he ought to be immediately attacked anew, in whatever formation the assailants may be in so as not to afford him the opportunity of reforming. But if the enemy straightway commences his retreat, he should be pursued at once. The artillery therefore should keep up an incessant fire on him and to do so should gallop up as close as possible to him as in such case, firing, from a long distance, is dangerous, owing to the loss which may be caused to their own troops who are following up the retreating foe. Only by acting in this manner, is it possible to complete the rout of the enemy. In such cases, it is of enormous advantage to bring up Cavalry and horse artillery who by the rapidity of their advance are always able to gain the flank of the retreating enemy when the artillery should open on him a heavy flanking fire. Such action of the Cavalry and Horse Artillery is certainly feasible in the case when the enemy is either not sufficiently strong in Cavalry for a counter movement, or when his Cavalry have already been defeated by that of the attacking force.

Attack of Field Works

In the attack of field works; redoubts, lunettes, and such like it is indispensably necessary to shell them beforehand with artillery, and preferentially, with guns of position, the shell and sherapnel of which by its powerful explosive action undoubtedly proves of great advantage. The batteries ought, from the beginning, to take up a position at the most effective range for artillery fire, *i.e.* about 1500-2000 yards, when the loss, from the enemy's musketry fire will not probably be very great. Moreover if it seems feasible, some guns ought certainly to be placed, in prolongation of the faces of the works, in order by an enfilading fire of of shells and shrapnel to disable the enemy's guns, to dishearten the troops, who may be placed immediately under the parapet, to cut down the palisades in the ditch, to demolish the abattes and so on. The other guns, fire shell against the front, aiming at the embrasures, and at the crest of the parapet they should also fire shrapnel thus covering with bullets and fragments of shell both the front, and crest, of the breastworks, and the interior of the, closed works. If there is ground commanding the entrenchments, which it is possible to utilise, it should be occupied by guns, in order the better to search the interior of the works. When the artillery, and Infantry fire, of the forts, is in great part silenced, then, according as the Infantry advance to the attack a part of the artillery ought to rapidly advance still nearer to the work, say about 900-1200 yards and by an independent, well aimed fire, finally silence the fire of the enemy. After this, the capture of the works, will depend on the success of the assault. If isolated batteries of the enemy's artillery, are observed on the flanks of the forts, in connection with, the general disposition of the enemy in the fighting line a separate artillery force should be told off to act against them. These batteries must be silenced, or otherwise it will be difficult to attack those works, whose fronts, are protected by a cross fire, from batteries placed outside them. When a work is captured, the artillery of the attacking force, should immediately advance, and coming into action on its flanks, open a close fire on the retreating adversary, and on his reserves. For the defence of a work, the guns inside it are placed on gun platforms, and fire either through embrasures, or "en barbette." By the first method, the guns are better covered from musketry fire, by the second they have a wider range. If the fire of the attacking artillery is very heavy, and there is no possibility of effectively withstanding it, it would be better to mark the guns from the enemy, removing them from the embrasures, and from the platforms, where they are firing "en barbette." When the attacking Infantry are preparing to deliver the assault, the guns ought to be quickly run up again to their former positions, in order to open a close and well aimed fire on the enemy, during his advance. For this purpose, the defenders have a great advantage, as all the ground round the work, should be well known and measured by them beforehand. For the defence of a work in the first line the batteries, should be placed in advantageous positions in its flanks, in order to bring a cross fire to bear over the whole space in front of it.

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CORRESPONDENCE REGARDING "MEAT BISCUITS" AND TINNED PROVISIONS FOR ARMY USE.

Communicated by the Secretary to the Government of India, M.D.

No. 6550.

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While I regret exceedingly that my preparation was not approved by the Simla Committee, I would ask you to bear with me while I lay before you my views—the result of years of study of the subject—on the feeding of soldiers in time of war.

Starting from the point that the Simla Committee say that preserved food in tins is the most suitable for the soldier, we must put on one side Chicago corned beef. The experience of the Soudan amply demonstrated, even to the Home War Office, the extreme unsuitability of such *salt* food, it having caused much suffering to the troops, not alone from thirst, but from other and more serious consequences of such a diet in a hot climate.

My information on this point was corroborated by the testimony of many non-commissioned officers with whom I had interviews on their return from that campaign. The French War Office fell in with my views. They rejected Chicago beef, and have now adopted for the use of the soldiers, *four* days a week, a kilo tin of preserved boiled beef, which contains 29 ozs. solid meat and 7 ozs. of jelly and fat. They have resolved to give the soldier on the remaining three days a ration of *saucisson potage* with bread, a ⅓ kilo sausage with a ⅓ kilo of bread or biscuit, making nine rations.

My objections to the boiled beef as above described *for use in India* are, first, that the jelly and fat would melt and mix, giving to the meat an uninviting, and indeed disagreeable, appearance; second, that there would be much loss from spilling in opening the tins.

The only other form in which boiled beef has hitherto been used is *the solid*. In this case the meat (before packing in the tins) is cooked and its juices poured off, depriving it of a great proportion of its nourishment.

A serious obstacle in the way of the carrying out the ideas of the Simla Committee is the great difficulty of obtaining the supplies in the event of European war. At the present moment the French War Office has monopolised the services of one of the *largest provision factories in America* for the next three years; and during the late scare both the French and German

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A serious obstacle in the way of the carrying out the ideas of the Simla Committee is the great difficulty of obtaining the supplies in the event of European war. At the present moment the French War Office has monopolised the services of one of the *largest provision factories in America* for the next three years; and during the late scare both the French and German

War Offices bought very largely what could be had in the market in London. These goods were to provision their respective fortresses.

There are two points I need hardly mention—the difficulty of transporting tinned goods great distances and the immense advantage to the soldier of some variety in his diet.

So far as is known at present there is no more perfect food for the soldier on a forced march than the consolidated soup I had the honor to submit to you ; each man could carry easily a 1lb. sausage, 9 rations. As you are aware the German soldier almost lived on a similar article throughout the Franco-Prussian War.

The *saucisson potage*, suitable for the British soldier, as per sample approved, can be manufactured in this country and put free on board in tin-lined cases at per ℔ in 1lb. skins, each seven pence half penny (7½*d.*)—note the reduced price I am now able to quote. Also I could manufacture a similar article for the use of the native troops, and which would not offend caste prejudices, packed as above at six pence half penny (6½*d.*) per ℔.

These terms would not operate for a less quantity than 500,000 *lbs. weight.* These statements and quotations apply to the article *manufactured in this country*, but I still adhere to my proposition in my letter of date 28th February to manufacture in India, if required, the price in that case to be increased to meet duties and other expenses impossible to foresee at this moment, yet, owing to changes in the market, very much cheaper than my February quotations.

If beef preserved in tins must form a part of the food of the soldier allow me to bring under your notice an article which I have perfected and which will keep good in any climate for many years, *viz.*, British army beef, which consists of minced beef with a proper proportion of fat and flavored with fried onions, pepper and salt. In this there is no waste ; all sinew, skin and bone are excluded, while all the juices of the meat are retained. It is cooked, and may be eaten cold or warm ; if warmed a fourth the weight of water should be added.

Should you desire it samples and prices can be forwarded without delay.

The importance of the subject must plead my excuse for so far encroaching on your valuable time.

I am, Sir,
Your obliged and obedient Servant,
J. MOIR CLARK.

Remarks by the Officiating Commissary-General-in-Chief on a letter from J. Moir Clark, Esq., to the Military Secretary to His Excellency the Commander-in-Chief.

The subject on which Mr. Moir Clark writes is one of so much importance to the well-being of the British soldier that I submit the following note on his letter for the consideration of His Excellency the Commander-in Chief in India :—

Mr. Clark commences by discussing the quality of the tinned meats used by the British army during recent campaigns, and condemns the Chicago beef altogether; but his letter shows that the extraordinary mistake was made of sending "corned" (and therefore *salt*) beef to Egypt instead of the ordinary tinned beef, which should contain no salt.

During the last two or three years about 1,400,000lbs. of Chicago (fresh) tinned beef have been issued to British troops at stations in India, and 550,000lbs. during the recent campaign in Burmah; and not a single complaint has, to my knowledge, been ever received regarding it.

I think it most important that a valuable source of supply (America) should not be set aside owing to the mistake above alluded to; and the fact that the French Government has given enormous orders to merchants in Chicago (which Mr. Clark himself says will keep their large factories going for the next three years) is a sufficient proof that tinned meat can be sent out from America which is thoroughly acceptable to the soldier. But it is, of course, necessary that *the right sort* be selected.

Mr. Clark points out that variety is essential, and notes that the French Government has decided on issuing boiled beef during only four days in the week and a ration of *saucisson potage* during the remaining three days. The quantities mentioned would seem to indicate a ration of about 9 ounces a day of the boiled beef and 4 ounces a day of the *saucisson potage*, whilst our soldiers receive a full pound daily. In India we look upon preserved meat as only an alternative and occasional issue, and calculate on being always able to give the soldier fresh meat on at least five days of the week.

Mr. Clark's remarks on the appearance of tinned meat in India are very pertinent. In a cold climate the nutritive juices of the meat form a wholesome jelly, which surrounds the meat, and is eaten with it. But in India this jelly becomes a dirty-looking liquid, which is generally thrown away, and with it much of the nutritive value of the meat.

Some tinned meats turn out almost solid, with scarcely any trace of the natural juices. They certainly *look* better than the others; but I fear the inference must be that the juices have been poured off during the process of tinning, and consequently the net result is the same, *viz.*, that the soldier gets little else but comparatively innutritious animal fibre.

It appears to me that the efforts of exporters should be directed to the manufacture of an article that shall retain the nutritious juices of the meat, and yet at the same time have a palatable and wholesome look.

I have of course no knowledge, beyond that possessed by the general public, of the exact details of the manufacture of tinned meats; but my impression is that an excellent army food could be prepared as follows:—

The tins being filled as compactly as possible with boneless meat, should be *half cooked* in the usual water bath. They should then be removed, and sufficient pea-meal or bean-meal added, to absorb all the juices which will be found to surround the meat in the tin. The cover should then be soldered on and the cooking completed in the usual manner.

I believe that the result would be a very palatable and highly nutritious food, which would be free from the defects of the present preparations.

Mr. Clark remarks that, "as far as it is known at present, there is no more perfect food for the soldier on a forced march than the consolidated soup"; and, if by the latter term is meant "consolidated *pea*-soup," there is no doubt that his opinion is perfectly correct. Few persons appear to be aware what a large amount of concentrated nourishment is contained in peas and beans and meal prepared from them, or how favorably they compare in nutritive value with meat itself.

For ready reference their relative percentage composition as extracted from Dr. Pavy's treatise on "*Food and Dietetics*" is here given :—

	Lean beef uncooked.	Beans dried.	Chenna.
Nitrogenous matter ...	19·3	30·8	22·70 (Forbes Watson).
Starch and cellulose ...	...	51·3	63·18
Fat ...	3·6	1·9	3·76
Saline matter ...	5·1	3·5	2·60
Water ...	72·0	12·5	11·39

It will thus be seen that, weight for weight, pea or bean-meal in suitable combination with other food ingredients is even more nutritious than meat.

This is recognised in foreign armies, and concentrated pea-soup, known under a variety of names, such as *Erbswurst*, &c., &c., is largely used in the diet of troops of other nations. But unfortunately the British soldier thinks he cannot get on without his daily allowance of *meat*, and it is to humour this fancy that I have proposed the mixture of pea or bean-meal with meat as detailed above.

Mr. Clark points out that an article of diet made up as a sausage is more portable than when tinned. This is true; but, when the climate of India is considered, it will, I think, be readily admitted that the skin covering would be altogether insufficient to preserve it. Only quite recently we had to condemn 20,000lbs. of concentrated pea-soup, which had become unserviceable in consequence of its having been sent out in tin cylinders without coverings at the ends.

The proposal to tin minced beef flavored with fried *onions*, pepper and *salt* raises the question as to what articles *are*, and are not, suitable for tinning. The following articles should, in my opinion, never form portion of any tinned food :—

Potatoes.
Onions or garlic.
Salt.

It is well known that tinned potatoes in any shape acquire a most disagreeable taste, and it is also believed that they entirely lose their antiscorbutic properties in the process. When fresh potatoes cannot be carried, the only efficient substitute is the desiccated potato. The soldier generally considers this unpalatable stuff, because he is too apathetic to season it properly; but I cannot help thinking that by a little ingenuity a small proportion of black pepper or other suitable condiment might be combined with the desiccated potato in the process of manufacture, and so do away with the present objections to it.

Onions contain sulphur. This sulphur is believed to combine prejudicially with the other contents of any tin to which onions are added. Onions should therefore be omitted from all tinned foods.

Salt is inadmissible for obvious reasons.

On the other hand tinned meats are apt to be somewhat tasteless, and the addition of a little black pepper, allspice, or even mustard, would be an undoubted improvement.

I think that the value of *meat biscuits* has been greatly overlooked. Some very interesting and successful experiments have been made in this direction in India, and are still in progress. I append a printed memo. of what was done up to the beginning of this year, and the results of our recent experiments will be communicated to Mr. Moir Clark if he is interested in the subject.

For the guidance of manufacturers in India I may mention that the meal prepared from Indian gram (*chenna*), which has first been parched and then ground, is a perfect substitute for bean or pea-meal, and is, I believe, superior to either, both in point of nutriment and palatableness. The parching adds much to the sweetness of the meal and facilitates its keeping.

H. P. HAWKES, *Colonel,*
Commissary-General-in-Chief.

MEAT BISCUITS.

Memorandum (No. 1) by the Officiating Commissary-General-in-Chief.

The following note shows what has been done up to date towards preparing meat biscuits, &c :—

No. 1.—Parker's meat biscuit.

"Not being satisfied with any of the meat biscuits I found in the market, nor seeing why an *extract* should be used in preference to the meat itself, I have made some meat biscuits in a very simple way by mixing together, cooking and baking—

1lb. Flour.
1lb. Meat.
¼lb. Suet.
½lb. Potatoes.

Seasoned with { Sugar. Onions. Salt. Pepper. Spices.

"A palatable meat biscuit, weighing about 1¼lb., containing 10 to 12 per cent. of water, is then obtained, which keeps quite unchanged for four months.

"I have not yet had an opportunity of keeping men on this food, but I have no doubt it would answer better than the '*carniset.*'

"A man could easily carry 8lb. weight, which would be sufficient for five days. It requires, of course, no subsequent cooking, but, if opportunity offered, it might be made into soup.

"After I had made this meat biscuit I observed that Dr Christison (Report of the Royal Sanitary Commission, 1858) had suggested a simple process of this kind."—(*Parker's Manual of Military Hygiene.*)

No. 2.—Madras meat biscuits.

At Secunderabad, in November, 1873, a meat biscuit, composed as follows, was made by Major Hawkes, Commissariat Officer there :—

1lb. Flour.
1lb. Beef deprived of gristle and chopped fine.
¼lb. Kidney suet chopped fine.
½lb. Potatoes boiled and allowed to get cold.
2ozs. Onions chopped fine.
½oz. Sugar.

Seasoned with { Salt. Pepper. Spices.

The result proved very successful. Eaten when fresh it was reasonably soft and very well flavored. Dried in the sun for a week the biscuits become harder.

No. 3.—Dolgorouky meat biscuit.

"The *Russian Military Gazette*, referring to the singular immunity enjoyed by the troops of the late expedition to Khiva from the fevers and other illnesses which usually attend such expeditions, attributes this result to the '*Dologorouky biscuit.*'

"All the provisions taken by the expedition, it says, consisted of a drove of live cattle and of these biscuits, which are of the size of a man's hand, and may either be eaten raw, dissolved in water, or cooked as soup.

"Their inventor, Prince Michael Dologorouky, first introduced the American meat biscuit into the Russian army, but it was found that they gave rise to various scorbutic disorders, and they were consequently abandoned.

"He then hit on the plan of making biscuits of—

Meal ... ...
Beef ... ...
Sour-krout ... ...
} in equal proportions,

and the biscuits thus prepared have become almost as popular in the Russian as the famous 'Erbswurst' is in the German army."

Another newspaper notice of these same biscuits mentions that they were made of equal parts of rye flour, meat reduced to powder, and sour-krout likewise powdered.

No. 4.—Pemmican.

"Pemmican can be made from the flesh of any animal. The meat is first cut into slices, dried either by fire or in the sun, and then pounded or beaten out into a thick flaky substance; in this state it is put into a large bag made from the hide of the animal, the dry pulp being soldered down into a hard solid mass by pouring melted fat over it."

"The quantity of fat is nearly half the total weight, 40lbs. of fat going to 50lbs. of 'beaten meat.'"

"The best pemmican generally has added to it 10lbs. of 'berries' and sugar."

"The Canadian *voyageurs* generally prefer to eat their pemmican raw, but it may be mixed with a little flour and fried in a pan. Pemmican in this form can be eaten provided the appetite be sharp and there is nothing else to be had; this last consideration is, however, of importance."—*Butler's Great Lone Land.*

Admiral Bythesea says the allowance of pemmican is one pound per man, and that it is generally prepared as a sort of stew or broth, and snow is added till the consistency required is attained. It is treated as ordinary meat.

Some pemmican sent out by the Admiralty was tried by the Naga Hill Survey party; the report was that, as no instructions for cooking it were received, various ways were tried, all utter failures; any preparation of sawdust would have been equally palatable.

It was also sent to the Delhi Camp in 1876, and was tried boiled, fried, stewed, and eaten on bread, and in every case found unpalatable.

CONCENTRATED SOUPS.

No. 5.—Edward's desiccated soup.

In 1879 the Secretary of State sent out a small sample of Edward's desiccated soup costing 2*s.* per pound. As it contained a large proportion of potato, antiscorbutic qualities were claimed for it.

The Chemical Examiner, Bombay, says that one pound of the preparation contains only as much nitrogenous matter (the chief nutritive constituent of meat) as one pound of beef. It is inferior in nutritive value to "Erbswurst" in the proportion of 4 to 5, but is superior to it as an anti-scorbutic for continued use, whilst the "Erbswurst" is a better diet for use for short periods only.

Edward's soup is considered by the Surgeon-General, British Forces, very well adapted to hospital use in a campaign, and a valuable adjunct to the supply of medical comforts, and was generally approved of by medical officers. Prolonged boiling is essential.

No. 6.—Whitehead's army food.

The Medical Officer, 92nd Foot, reported that Whitehead's army food was a very tasty and nourishing pea soup (1880).

It contained vegetables and meat. (Dr. Kenny.)

It is in dry squares. (Dr. Wright.)

But not so good as "Erbswurst."

No. 7.—Kopf's consolidated soup.

Kopf's soups of various kinds are well reported on, the pea soup being considered the best.

No. 8.—Erbswurst (consolidated pea soup).

" The (consolidated pea soup) Erbswurst is to be prepared from ingredients of the very best quality, perfectly fresh, and carefully selected, in the following proportions :—

	lb.
" Peas, ground	60
" Fat, Aberdeen	14¼
" Salt, ordinary block	4
" Pepper, black	½
" Mint	¼

" To be put up in 2oz. tins.

" The term ' Erbswurst" signifies ' pea sausage,' but the preparation for India is put up in tins."—*Secretary of State, No. 141 of 3rd June, 1886.*

No. 9.—Russian concentrated soup.

Trials were made in the Russian army of certain concentrated soups, which are arranged according to their palatableness as follows :—

Concentrated Oatmeal soup.
" Potato soup.
" Pea soup.
" Fungus soup.

Pickled cabbage soup and groats soup were also tried, but were declared unpalatable, the former on account of its acid taste.

On a combination of the different reports the opinions were found to be as follows :—

(*a*)—The importance of conserves for war purposes is indisputable. They are easy to transport, to keep and to cook. Their preparation requires very little fuel, and to the taste an agreeable change is easily made. The conserves possess, as compared with fresh food, the advantage of being easy to keep good. It is further looked upon as an advantage that they can only be eaten warm, as they tend in this form to stimulate the body against cold and fatigue.

(*b*)—The universal complaint was made that the portions allowed were insufficient. The soldiers declared unanimously that their appetite was not satisfied by them, and those officers who had not had recourse to additional food during these trials declared themselves to the same effect. This matter is easy of explanation when one considers that the soldier is accustomed to fill his stomach with a large quantity of food which, although it may possess no intrinsic value in the way of actual nourishment, fills his stomach and thus prevents emptiness of it.

(*c*)—As regards taste the conserves are very inferior to fresh food ; the soldiers very soon get tired of them, and it is considered that it will, therefore, only be feasible to issue them for any length of time in special cases.

(*d*)—Any change in the condition of health was not observed, and the conserves found to be easily digestible.

(*e*)—No diminution resulted in the weight of the men, but it is considered that the periods during which these trials lasted were not sufficiently long to expect such results.

(*f*)—It was found that these conserves took a longer time to cook than is laid down in these directions.

As the following general rules laid down for these experiments in the Russian army form an excellent guide for similar trials, they are here given :—

1. The trial with these conserves is not to exceed one week at a time.

2. The officers and non-commissioned officers are to explain fully to the men the importance of these trials for war purposes, and special care is to be taken that the men understand clearly that there is no intention whatever to replace for good the fresh articles of food by means of these conserves. Every man should be encouraged to express himself without any reserve on the value of this food. Officers should personally participate in these trials as an encouragement to the men, and to be able to afford a judgment on the point.

3. The medical officers should similarly participate in these trials. A medical officer in each regiment or corps should be specially directed to watch these experiments, and to pay great attention to the influences they may exercise on the condition of the men; also to the quality of these conserves. and he should note all his observations in a journal which he will keep for this purpose.

4. On the evening before these trials take place all the men who are to undergo it are to be submitted to a careful medical inspection; their weight is to be ascertained and to be shown opposite to their names.

5. The conserves are to be cooked in large cooking utensils to obtain the utmost similarity in their preparation.

6. In the selection of the conserves a change of dishes is to be considered and attention is to be paid regarding their selection on fast days, *viz.*, on Fridays and Wednesdays.

7. The medical officers are to be careful in noting their observations: they are frequently to visit the troops, and especially so at their noon and evening meals, when by means of conversation, they should ascertain the opinions of the men.

8. On the termination of these trials the men are to be again carefully examined medically; their weight is also again to be ascertained, and these results to be carefully entered.

9. No change in the usual manner of life and employment was allowed to take place. The special strong and healthy men were selected

for these trials, and any men subject to indigestive complaints were excluded therefrom.

MEMORANDUM (No. 2) BY THE OFFICIATING COMMISSARY-GENERAL-IN-CHIEF.

In continuation of my previous note, and with reference to the penultimate clause of my note of 20th August on tinned meats, I now give the result of the recent experiments with meat biscuits made according to several different recipes.

2. In accordance with suggestions from this office, trials were made at Poona, Umballa and Ferozepore. The recipes were as follow:—

Umballa and Ferozepore.—Major Hobday and Lieut. Tyler.

3. *Recipe No. 10.*—

Bread meal	4 lbs.
Fresh beef	4 „
Suet	1 „
Fresh potatoes (*boiled*)	1 „
Compressed vegetables	2 ounces.
Sugar	2 „
Pepper, black	¼ „
Dried tamarind	¼ „

N.B.—These biscuits were three months in store before trial.

RESULT.—*A very palatable biscuit.*

Umballa and Ferozepore.—Major Hobday and Lieut. Tyler.

4. *Recipe No. 11.*—

Bread meal	4 lbs.
Fresh beef	4 „
Suet	*Nil.*
Fresh potatoes (*boiled*)	2 lbs.
Gram (Chenna) flour	12 ounces.
Fresh onions	8 „
Sugar	2 „
Curry powder	½ „
Pepper, black	¼ „

N.B.—These biscuits were three months in store before trial.

RESULT.—*A nice crisp biscuit, quite fit to be eaten without further preparation, but best prepared by boiling in water with salt and a little pepper.*

Umballa.—Major Hobday.

5. *Recipe No. 12.*—

Bread meal	4 lbs.
Fresh beef	4 „
Suet	1 „
Fresh potatoes (*boiled*)	1 „
Amchur (dried mangoe)	¼ ounce
Sugar	2 „
Pepper. black	¼ „

N.B.—These biscuits were three months in store before trial.

RESULT.—*A biscuit much resembling that made by Recipe No. 1.*"

Poona.—Mr. Turner.

6. *Recipe No. 1.*—

Flour ...	... 4	lbs.
Fresh beef ...	... 4	„
Suet ...	... 1	„
Potatoes (*boiled*)	... 2	„
Onions ...	... 8	ounces.
Sugar ...	... 2	„
Salt, Pepper *and* Spices *q. s.*		

N.B.—These biscuits were left in an open box for six months, throughout the rainy season, before trial.

Result—*The biscuits were tried by two British regiments in Bombay and favorably reported on; they have also been tried here and found very palatable. This recipe is identical with that of the original experiment made at Secunderabad in 1873.*

7. The above trials must, I think, be considered very promising. Up to the present they have only been made on a very limited scale, and larger experiments will be needed before one of the above recipes is selected or an improved recipe introduced.

8. These meat biscuits *may* be eaten without further preparation, but they are far more palatable when boiled in the soldier's mess-tin with water and a little salt and ground pepper until the biscuits become soft; they should then be eaten *with the liquid*, which has become a very nutritious *soup*.

9. As a guide for future experiments the following suggestions are made:—

(*a*)—The meat biscuits should not exceed ¼ inch in thickness.

(*b*)—They should be gradually *dried* rather than *baked* in a very slow oven. Thorough drying is essential, or they will not keep.

(*c*)—They should not contain salt. This will be added during cooking—see paragraph 8.

(*d*)—Though they will bear a great deal of exposure they are better kept in tin canisters, which need not, however, be soldered down.

(*e*)—When they are likely to be consumed within a month or two they may be packed like ordinary biscuits.

10. It has been found that meat biscuits lose nearly 50 per cent. in baking. This loss is chiefly caused by the evaporation of the water contained in the fresh meat and potatoes, but the farinaceous constituents are not materially affected. Half a pound of meat biscuit with half a pound of ordinary biscuit should, therefore, be fully equal in nutritive value to one pound of fresh meat and one pound of bread.

11. With reference, however, to mistaken ideas regarding meat biscuits which often prevail, I add an extract from a pamphlet entitled "*Camps of Exercise from a Commissariat point of view,*" published by the Madras Government in 1874:—

"The gelatine of the meat makes the biscuits hard. They are not, therefore, intended to be eaten like ordinary biscuits (though this may be done on emergency), but they should be pounded up and made into soup by simple boiling with water in the soldier's tin mug. Treated in this way they form a very palatable, refreshing and wholesome meal.

"I must, however, guard against the incorrect notions which are very generally held regarding these or similar biscuits. The term 'meat biscuit' conveys to many minds the idea of a biscuit combining the delicate flavor of a fresh mutton chop with that of a new loaf of bread, with the advantage over both of being thoroughly portable. I need hardly say that such persons must necessarily be disappointed. A meat biscuit is not intended, even as a passable substitute, for a fresh ration whenever the latter can be had, but as a wholesome and fairly palatable food when the rapidity of movement carries the soldier beyond his Commissariat, and so renders him dependent on what he can carry with him. This state of things occurs so rarely in India that there is but little chance of the meat biscuit becoming an institution at present, but the experience of the Russian army on the march to Khiva shows that men may be required by circumstances to live almost exclusively on portable food of this sort.

"I would also add that my biscuit may be made entirely by simple machinery. In my small experiments the ingredients were all thrown into a mincing machine which both minced and mixed the materials at the same time, and turned out the biscuit ready for baking. By making a hole in the centre of each biscuit they can be conveniently strung on stout twine, and are thus very easily carried."

12. The medical officer in charge of the station hospital at Umballa expresses the following opinion regarding the meat biscuits made according to the foregoing recipes Nos. 10, 11 and 12 :—

"I have examined the specimens of meat biscuits forwarded to me a few days since, and consider them all equally palatable and good in flavor, and should the meat biscuits, &c., retain their nutrient value after preparation I consider that they would be very useful on active service as a stand-by, in case of shortness of supplies, &c. I should myself often have been very glad when on service to have had one or two of such biscuits in my possession. To discover the present nutrient value of them would require an analysis which it is not in my power to make."

(Sd.) H. P. HAWKES, *Colonel,*
Offg. Commissary-General-in-Chief.

Note by the officiating Commissary General-in-Chief on experiments in preparing desiccated vegetables in India.

The results of the experiments made in the early part of this year are very satisfactory and lead to the conclusion that it is possible to find in locally preserved vegetables an occasional substitute for fresh and English-preserved vegetables which will be acceptable to the soldier (British and *Native*).

2. The object of the trials, the results of which are shown in the statement attached, was to ascertain whether our country-grown English vegetables could be dried in the sun and thus preserved for despatch to the field for immediate consumption.

3. In the experiments made, the vegetables after being thoroughly dried in the sun were stored in air-tight tins which runs up the cost considerably, but for the purpose of supplying troops in the field it would not be necessary to do more than pack in wooden cases (in the Lahore jail the vegetables dried for the prisoners' rations are stored in jute bags, and the Superintendent of the jail in noting to this effect does not say that such packing is ineffective), which would bring the cost well within that of the English compressed vegetable while the locally preserved article would be equally acceptable. The figures leading up to this conclusion are embodied in the statement attached.

4. The preserving of the vegetable is a very simple matter. The vegetables to be preserved should be well grown but not hard or stringy; only really good vegetables should be used.

The following kinds are suitable:—Cauliflower, Cabbage, Kale, Turnips (peeled), Knol kohl, Radish, Spinach, English Mustard, Carrots, and Beet-root; but the last two, or any vegetables that contain much sugar, would probably not give such good results as others, and yet in the experiments detailed within, carrots have generally turned out well. For general purposes cauliflower and cabbage are undoubtedly the best, and in these experiments have given the best results.

February, March and April are the best months of the year for desiccating the vegetables as the atmosphere is then dry and the sun hot, and vegetables good and plentiful; it is doubtful whether vegetables dried during any other period of the year will give satisfactory results, and any attempt at drying during the monsoon will result in failure.

The vegetables having been stripped of all outside leaves and useless roots and stalks should be cut up into pieces about ½ an inch thick and placed in the sun (on charpoys with bottoms of interlaced rope) until thoroughly dry; five or six days will generally be found sufficient for this purpose. Twelve pounds of fresh vegetables will produce one pound of dried vegetable, three and a-half to four ounces of which will give one pound when cooked and are thus the equivalent of the ration of fresh vegetable or of two ounces of *English* compressed vegetables. After soaking for about an hour in hot water they are left till the water has become cold, and are then to be cooked like ordinary vegetables.

(Sd.) H. P. Hawkes, *Colonel,*
Offg. Commissary General-in-Chief.

Preserving Vegetables.

From the information tabulated within, the following particulars are obtained :—

(1)—2,425 lb. fresh vegetables yield 199 lb. 12 ozs. dried vegetables, or about $\frac{1}{12}$.

(2)—1,853 lb. fresh vegetables cost Rs. 57-1-3 =, say, 6 pies per lb. cost of tins = 9 pies per lb. dried vegetable = $\frac{9}{12}$ pies per lb. of fresh vegetable.
Total, say, 7 pie per lb. fresh vegetable = 7 annas per lb. preserved vegetable.

(3)—37 lb. dry vegetable = 130 lb. when cooked, or say 4 oz. dry (preserved) = 1 lb., fresh or the equivalent of 1 ration.

(4)—The comparative cost is as follows :—

	A.	P.
The ration of fresh vegetable cost ...	0	6
Do. English compressed vegetable (2. oz.) ...	1	7½
Do. Country preserved vegetable (4 oz.) tinned	1	9
Do. Country preserved vegetable not tinned ...	1	6

N. B.—Particulars of the experiments carried out in the Eastern Circle are given in the separate statements **A, B** and **C** attached.

Taking all the experiments in the three presidencies, the following results are obtained :—

(1)—4,000 lb. fresh vegetables yield 320 lb. dried vegetable, or rather over $\frac{1}{12}$. One twelfth may, therefore, be taken as a safe yield on which to reckon.

(2)—4,000 lb. fresh vegetables cost Rs. 85 = 4 pies per lb. cost of tins =, say, 1 anna per lb., dried vegetable = 1 pie per lb. fresh vegetable.
Total 5 pie per lb. fresh vegetables = 5 annas per lb. preserved vegetable.

Note by the officiating Commissary General-in-Chief on experiments in preparing desiccated vegetables in India.

The results of the experiments made in the early part of this year are very satisfactory and lead to the conclusion that it is possible to [illegible] locally preserved vegetables as [illegible] substitute for fresh and English-preserved vegetables which will be acceptable to the [illegible] (British and *Native*).

2. The object of the trials, the results of which are shown in the statement attached, was to ascertain whether [illegible] English vegetables could be dried in the sun and thus preserved [illegible] used for immediate consumption.

3. In the experiments made, the [illegible] dried in the sun were stored in [illegible] only, but for the purpose of supplying [illegible] necessary to do more than pack [illegible] the vegetables dried for the prisoners [illegible] the Superintendent of the jail [illegible] such packing is ineffective, [illegible] the English compressed vegetables [illegible] be equally acceptable. The [illegible] embodied in the statement attached.

4. The preserving of the [illegible] vegetables to be preserved [illegible] only really good vegetables [illegible]

The following kinds are [illegible] Turnips (peeled), Knol kohl, Rad[illegible] and Beet-root; but the last two [illegible] would probably not give such go[illegible] ments detailed within, carrots hav[illegible] purposes cauliflower and cabba[illegible] experiments have given the best [illegible]

February, March and A[illegible] desiccating the vegetables as the [illegible] and vegetables good and plenti[illegible] during any other period of the year [illegible] attempt at drying during the [illegible]

The vegetables having been [illegible] roots and stalks should be cut [illegible] placed in the sun (on charpoys [illegible] thoroughly dry, five or six days will generally be [illegible] purpose. Twelve pounds of fresh vegetables [illegible] dried vegetable, three and a half [illegible] pound when cooked and are [illegible] vegetable or of two ounces of [illegible] for about an hour in hot water they are [illegible] and are then to be cooked [illegible]

(Sd.) H. P. Hawkes [illegible]

[illegible]

Preserved [illegible]

From the information thus obtained within, the following [illegible] obtained [illegible]

(1) 2 lb. fresh vegetables [illegible]

(2) [illegible]

(3) [illegible]

(4) [illegible]

[illegible]

(3)—1 lb. dried vegetable = 4½ lbs. when cooked, or, say, 3½ ozs. dried vegetable is the equivalent of the ration of fresh vegetable. (If cabbage and cauliflower only were issued, 2 oz. dry would be the equivalent of the ration of fresh vegetable.)

(4)—The comparative cost is as follows:—

	P.	A.
The ration of fresh vegetable costs	0	4
Do. English compressed vegetable (2 oz.) ...	1	7½
Do. Country preserved vegetable (3½ ozs.) tinned	1	0
Do. do. do. (3½ ozs.) not tinned	0	10½

Statement showing the results of

Station at which the experiments were made.	Description of vegetables experimented on.	Weight of fresh vegetables.		Loss on tops, peelings, stalks, &c.		Reduced weight of fresh vegetables.		No. of days employed in drying.	Loss in drying.		Reduced weight of dried vegetables.	
		lbs.	oz.	lbs.	oz.	lbs.	oz.		lbs.	oz.	lbs.	oz.
Umballa ...	Beetroot ...	120	...	397	...	275	...	6	242	10	8	6
	Turnips ...	200	...								12	12
	Cabbage ...	352	...								11	4
	Total ...	672	...	397	...	275	...		242	10	32	6
Mian Mir	Cabbage ...	192	...	37	...	172	...		...	...	15	...
	Turnips ...	45	...			28	...		...	...	1	8
	Total ...	237	...	37	...	200	...		...	..	16	8
Mian Mir	Carrots ...	70	...	75	...	225	...	4 or 5 days in the sun & 1 day in the shade.	193	4	31	12
	Cabbages ...	60	..									
	Turnips ...	70	...									
	Beet ...	100	...									
	Total ...	300	...	75	...	225	...		193	4	31	12
Bangalore	Potato in discs	26	...	4	14	21	2	7	16	9	4	9
	Potato in shreds	24	...	4	...	20	...		15	12	4	4
	Cabbage shreded	50	...	7	8	42	8		39	11	2	13
	Knol Kohl discs	36	...	11	8	24	8		22	10	1	14
	Turnips discs...	22	...	13	8	8	8		7	11	...	13
	Carrots ...	50	...	17	8	32	8		28	8	3	...
	Beetroot ...	42	...	14	...	28	...		25	8	2	8
	Celery in pieces 2″ long ...	4	8	1	11	2	13		2	10½	0	2¼
	Total ...	254	8	74	9	179	15		159	15½	19	15¼

experiments in preserving vegetables.

Outturn per cent.	Period preserved.	Quantity when cooked, or after being steeped in hot water.	Cost of vegetables.	Cost of tins.	Total cost.	Remarks.
7	2 months	...	2 13 0	...	...	
6·4	3 ,,	...	4 12 0			(a)
3·2	...	...	6 15 0			(b)
...	...	...	14 8 0			
8·7	...	...	7 12 5	...	..	This experiment proved a failure and a fresh experiment was tried with good vegetables from the Lawrence Gardens (see next entry).
5·4	...	...	1 5 10			
...	...	...	9 2 3			
10·6	2 months	...	11 12 0	...	...	(c) (d)
...	...	...	11 12 0			
8 p.c. avg.	2 months	1 oz. = 4½ oz...				This experiment was made early in June, at which time of the year our English vegetables are generally overgrown and unsuitable for preserving. Climatic influences were besides unfavourable, the air being moist and the sun not very powerful. Failure was anticipated. See note (u)
		1 oz. = 5 oz. ...				
		1 oz. = 3 oz. ...				
		1 oz. = 3 oz. ...				
		1 oz. = 3 oz. ...				

Statement showing the results of

Stations at which the experiments were made.	Description of vegetables experimented on.	Weight of fresh vegetables.		Loss on tops, peelings, stalks, &c.		Reduced weight of fresh vegetables.		No. of days employed in drying.	Loss in drying.		Reduced weight of dried vegetables.	
		lbs.	oz.	lbs.	oz.	lbs.	oz.		lbs	oz.	lbs.	oz.
Poona ...	Cabbage (without outer leaves	...	...	...	...	15	..	5	14	1	..	15
	Carrots ...	..	...	...	...	4	6					
	Carrots ...	..	...	...	...	4	6		3	14½	...	7½
	Beetroot ..	...	...	...	...	4	$0\frac{4}{5}$		3	14½	...	7
	Turnips ...	...	...	...	..	3	...		3	$7\frac{4}{5}$	...	9
	Turnips ...	*	...	...	..	...	...		2	13	...	3
Mhow ...	Carrots ...	200	...	...	...	...	...	5				
	Cabbage ...	100	...	...	...	...	...		...	...	37	...
	Cauliflower ...	100	...	...	...	...	...					
Deesa ...	Cabbage ...	236	...	...	...	...	...	6	...	...	15	15
Jubbulpore	Carrots ...	25	...	...	...	...	...	...	...	...	3	6
	Turnips ...	25	...	...	...	...	...	...	...	...	2	4
	Cabbage ..	25	...	...	...	...	...	...	...	...	1	15
	Cauliflower ...	25	...	...	...	...	...	...	...	...	2	8
Saugor ...	Potato slices ...	80	...	...	..	...	...	5			18	8
	Turnips ...	80	...	...	...	...	..		...	...	6	8
	Carrots ...	80	...	...	...	...	...				8	8
	Turnips (without leaves) ...	...	...	...	..	3	...	5	...	...	...	3
	Cabbage ...	...	...	...	..	6	7	7	...	...	...	7
	Carrots ...	...	...	...	...	4	$6\frac{2}{5}$	7	...	...	...	7½
	Beetroot ...	...	...	...	...	4	$0\frac{4}{5}$	4	...	...	...	9
	Cauliflower ...	...	...	...	...	6	7	7	...	...	...	7

experiments in preserving vegetables.

Outturn per cent.	Period preserved.	Quantity when cooked, or after being steeped in hot water.	Cost of vege-table.	Cost of tins.	Total cost.	Remarks.
	2 months	...				
...	3 ,, ..	3 oz. = 1 lb. 2½ oz	...	...	...	(*e*)
	4 ,, ...	3 ,, = 1 ,, 6 ,,				
...	2 ,, ..	2 ,, 11 ,,	...	...	0 5 0	
...	3 ,, ...	2 ,, 14 ,,	...	...	..	(*f*)
...	2 ,, ...	3 ,, 0 ,,	0 2 0	0 1 0	0 3 0	(*g*)
...	3 ,, ...	1 ,, 14 ,,	...	...	...	(*i*)
...	2 ,, ...	...	...	...	...	(*h*) *Weight experimented on not accurately ascertained.
			6 4 0			
...	3 ,, ...	...	6 4 0	...	...	(*j*)
			6 4 0			
...	2 ,, ...	...	...	...	...	(*k*)
	3 ,, ...					
...	2 ,, ...					
...	3 ,, ...	...	...	...	...	(*l*)
...	...					
...	...					
...	2 ,, ...	41 lbs. 8 oz.	1 4 0			(*m*)
...	3 ,, ...	26 ,, 0 ,,	0 5 0	1 8 0	4 5 0	(*n*)
...	4 ,, ...	36 ,, 0 ,,	1 4 0			(*o*)
...	4 ,, ...	1 ,, 5 ,,	...	...	...	(*p*)
...	2 ,, ...	3 ,, 1 ,,	...	...	...	(*q*)
...	4 ,, ...	2 ,, 10 ,,	...	...	...	(*r*)
...	4 ,, ..	2 ,, 13 ,,	...	...	...	(*s*)
...	3 ,, ...	6 ,, 0 ,,	...	..	...	(*t*)

(*a*) Tested after two months the vegetables were found to be fresh and good. The cabbages and beet-root were in the best state of preservation; the turnips seemed to have lost their flavor. Samples were sent to the Staff Surgeon who reports that they were good and palatable and that they apparently retained their antiscorbutic properties.

(*b*) Tested after 3 months there were no signs of mould and all appeared outwardly in the same condition as when first tinned. Samples were sent to Brigade-Surgeon Scott, to Conductor Harris, and to the Executive Commissariat Officer who are unanimous as regards the good quality of the vegetables, the dried cabbages being the best of the three kinds preserved.

(*c*) Tested after two months and found to be in the same state as when tinned. A small quantity of each vegetable was cooked; the original flavor was retained, but the freshness of color was gone. If properly cooked they are quite palatable.

(*d*) Tested after three months when cooked were found to be in the same good condition as on the previous occasion.

(*e*) Packed and sealed in tins on 24th January 1887. Tested after 2 months and found to be in a good state of preservation and apparently quite wholesome. The dried vegetable was thoroughly soaked and then cooked, the result appeared fairly good; in appearance and taste the properties of fresh cooked vegetables were retained, cabbage generally appears to be better in quality after being thus treated.

Tested again after 3 months when the vegetable appeared wholesome and good.

(*f*) Appeared to be very good in appearance and taste. Should be thoroughly soaked in boiling water before being cooked.

(*g*) This vegetable when cooked appeared to possess nearly the qualities of the fresh vegetables when cooked and was the most palatable of any of the vegetables.

(*h*) Remarks under (*e*) apply.

(*i*) Outturn appeared quite fresh and wholesome; but the outturn in turnips is inferior in quality to other vegetables.

Tested again after 6 months the vegetable preserved at Poona gave satisfactory results, beetroot, cabbage and cauliflower being the best in appearance and taste.

(*j*) Packed in air-tight canisters at end of March 1887. Opened after 3 months and a small quantity steeped in boiling water and then boiled as ordinary fresh vegetables. The cabbage and cauliflower tasted well, but the carrots appeared to have a strong taste. In this experiment, owing to a misunderstanding, the three descriptions of vegetable were preserved mixed together.

The Executive Commissariat Officer, Mhow, reports as follows regarding a subsequent test:—"Owing to the vegetables not having been kept separate, and owing to more carrots having been dried than other vegetables and mixed with them, the taste of the carrots is very strong and has spoiled the taste of the other vegetables, and, therefore, when tried, they were not altogether appreciated, though the men of one corps to whom they were issued said they preferred these dried vegetables to the preserved vegetables issued in 1885 in lieu of potato ration."

Alluding to a subsequent experiment in preserving vegetables separately and which was not a success, he states as follows:—

"This trial was made after the monsoon had commenced, and it is probable that the vegetables were not thoroughly dried."

(*k*) Tested after two months and again after three months and found to be in fresh condition and fit for use.

(*l*) Tested after 2 months the Officer Commanding 2nd Bn. Royal Warwickshire Regiment, Jubbulpore, states that their condition and quality when cooked was good and wholesome. He considers them an excellent substitute for fresh vegetables when such are not procurable, particularly the cauliflower which is the greatest success. He considers 4 ozs. of the preserved vegetable the equivalent of 1 ration.

Tested again in July, after a further period of 2 months, he considers them as good as at the first period.

Ditto September ditto ditto ditto.

Tested after 3 months the Officer Commanding 2-3 R.A. reported as follows. "They are not generally appreciated by the men, mainly owing to their color, after being cooked, which in the case of carrots and turnips is black; they are not so tender as the fresh vegetable would be, but they still retain some of their original flavor."

The Commissariat Officer, Jubbulpore, personally tried a portion of these vegetables, and entirely concurs with the Officer Commanding 2nd Bn. Royal Warwickshire Regiment, that the experiment is a success.

(*m*) Tested after two, three and four months the preserved potatoes had become blackened, but were free from smell and quite as dry as when tinned; the chief defect appears to be in color, although they were not very palatable when cooked.

(*n*) Turnips—when boiled with meat they savour soup almost as well as if fresh.

(*o*) The carrots are quite palatable and good, more specially in soup or stew.

(*m*), (*n*), (*o*). Tested at end of six months, the carrots and turnips were found to be quite as fresh as when put up in tins. The potatoes were black and flavorless.

(*p*) Sound and good though rather stringy and tough, smell and taste fair.

(*q*) Appeared wholesome and good.

(*r*) Fresh and wholesome.

(*s*) Fresh and wholesome.

(*t*) The cauliflowers turned out nearly weight for weight.

(*u*) The Executive Commissariat Officer, Bangalore, who personally tested the vegetables after they had been in tin 2 months is of opinion that the experiment is a failure, the vegetables generally, when cooked, being unpleasant to the sight, smell and taste (the celery alone having a good flavor), but this result was anticipated for the reasons given in the note against Bangalore in the statement.

Colo
Lt-Colo
Colonel ...
Major ...
Maj.-Genl.
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Pe
Petrie, R.
Phayre, A.
Philipps, I. ...
tman, C. E. ...
Carew, R.
W. C....
R. H.

Mi
5th Madr
...mbers.

cauliflower when boiled become
carrots become 10 ozs.,

cauliflower when boiled become 15 ozs., carrots become 10 ozs., turnips 11 ozs. and beetroot 7 ozs.

* Were not liked by the men to whom issued. The Executive Commissariat officer is of opinion that the green vegetables tinned in March were not perhaps so good as those tinned in February. Good vegetables are procurable at Barielly between 20th January and 10th March. A trial with vegetables preserved during that period may be successful.

he Committee considered the preserved vegetables a very valuable addition to soldier's ration and an efficient substitute for the lb. of potatoes hitherto supplied. The General Officer Commanding concurred in the opinion of the Committee, having personally tasted the preserved vegetables, and recommended further trials.

UNIV. OF MICH.

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uantity of green vegetables used in making experiments at the several stations in rn Circle for drying and preserving English vegetables for troops in the field, loss by dryage and the outturn of dried vegetables.

Name of vegetables experimented upon.	MEERUT.			BAREILLY.			LUCKNOW.			ALLAHABAD.			Remarks.
	ity of vege- used.	y dry-	urn of vege-	ity of vege-	y dry-	n of vege-	ity of vege- sed.	y dry-	n of vege-	ity of vege- sed.	dry-	of vege-	

C

Statement showing the comparative cost of preparing 100 lbs. of dried vegetables at different places, prepared from Executive Commissariat officers statements.

Name.	BAREILLY.				MEERUT.				ALLAHABAD.			
	f green s requir-	en vege- Rs. 2 per lbs.	cies and Rs. 2 per	per %	of green requir-	en vege-	cies and	per %	of green s requir-	reen ve- per 50	cies and	per

	Quantity c vegetables ed.	Cost of gre tables at I md. or 82	Contingenc labor at R % lbs.	Total cost lbs.	Quantity vegetables ed.	Cost of gre tables at	Contingen labor at	Total cost lbs.	Quantity vegetable ed.	Cost of g getables lbs.	Contingen labor at	Total cost % lbs.
	lb. oz.	Rs. A. P.	Rs.	Rs. A. P.	lb. oz.	Rs. A. P.	Rs.	Rs. A. P.	lb. oz.	Rs. A. P.	Rs.	Rs. A. P.
Beetroot ...	...	...	...	...	1,842 2	2 4 5 per % lb.	...	41 14 10	784 5	3 2 0	...	49 0 4
Turnips ...	1,250 0	30 7 9	2	32 7 9	1,760 0	1 8 3 per % lb.	...	30 4 3	1,212 0	1 8 4	...	36 13 10
Cabbages ...	1,025 10¼	25 0 3	2	27 0 3	2,303 8	2 7 0 per 167 lb.	...	33 9 11	1,269 13	2 4 0	...	57 2 3
Carrots ...	...	...	...	...	1,050 0	1 8 3 per % lb.	...	12 2 8	879 2	0 12 6	...	13 11 9
Cauliflower ...	1,379 5	34 0 11	2	36 0 11	4,283 5	2 5 0 per 128½ lb.	...	77 1 3	1,052 10	3 12 0	...	78 15 2
Total ...	...	...	...	95 8 11	...	...	...	244 0 11	...	...	...	235 11 4
Average cost % lbs. exclusive of tins	...	...	...	31 13 8	...	...	...	48 13 0	...	...	...	47 2 3
Add— Probable cost of 50 tins of 2 lb. each @ 0-4-0 each	...	...	...	12 8 0	...	...	...	12 8 0	...	...	...	12 8 0
Total ...	...	...	...	44 5 8	...	...	...	61 5 0	...	...	...	59 10 3

The last English price of compressed vegetables, exclusive of freight and other contingencies, as intimated to this office by the Commissary General, Western Circle, is *1s. 1d.* per lb., therefore the English price itself of 100 lbs. compressed vegetables would be £5. 8s. 4d., which, at the current year's rate of exchange, *viz. 1s. 6d.* per rupee) is equal to Rs. 72-3-7. The cost of English compressed vegetables is therefore higher than the price of Indian dried vegetables.

COMMISSARY GENERALS' OFFICE,
EASTERN CIRCLE;
Meerut the 22nd September 1887.

NOTES ON THE SWIMMING OF RIVERS BY CAVALRY.

Communicated by the Adjutant-General in India.

Copy of a letter from BRIGADIER-GENERAL C. J. EAST, Commanding Saugor District, to the Adjutant-General in India, Simla.

I have the honor to forward, for submission to His Excellency the Commander-in-Chief, some notes on the swimming of rivers by Cavalry. These notes I have prepared from accounts of Russian experiments published in the "*Revue Militaire de l'Etranger*," Major-General Brackenbury's "The Nile Column" and from the results of practice carried out near Jubbulpore by a troop of the 2nd Bengal Cavalry.

2. The troop of the 2nd Bengal Cavalry stationed here last year, after having practised swimming on five or six occasions, crossed the Gour River, where it is 80 yards wide, in fourteen minutes. The raft was already prepared, and the time was reckoned from the giving of the order to dismount to the moment when *the whole* of the men had redressed, saddled and mounted, and were ready to move off on the further side.

3. The swimming by droves I saw carried out in Burma by mules of a mountain battery. The crossing took longer than it should have done, but it was evident that with a little practice the mules would have crossed rapidly and without trouble.

4. There is, I believe, a belief amongst the natives of India that a camel cannot swim; that water gets into his ears and he sinks. I have not tried the experiment of swimming camels, nor have I come across any account of a large number of these beasts swimming a river except that given by Major-General Brackenbury of his very successful crossing of the Nile, and a newspaper description, which I cannot trace now, of the crossing of a rapid stream by some camels of the Afghan Boundary escort, when, if I remember correctly, the camels were left to swim by themselves, with the result that many of them were drowned.

Swimming of rivers by Cavalry.

It is not possible for large bodies of Cavalry soldiers fully dressed,[*] equipped and armed to swim across rivers. In these days, when so much is expected from Cavalry in the way of distant reconnaissances and raids, it is necessary, in order that the troops of this arm should not be checked by any insignificant stream of water, that they should be practised in swimming their horses across rivers and transporting their clothing, arms and saddlery by boats, or by other means that can be improvised on the spot.

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[*] See in Count Tolstor's "War and Peace" an account of the disastrous attempt of a regiment of Polish Lancers to swim the Niemen.

There are two methods for swimming horses across rivers ; one is for each man to accompany and guide his own horse ; the other is for a few men to guide the leading horses and for the remaining horses to follow by themselves in a drove. In both cases arrangements must be made on the spot for transferring all clothing, arms and saddlery (if the latter be not left on the horses) from one bank to the other without their getting wet.

It is necessary to select the most suitable places for entering and leaving the water. Banks and a muddy ground are bad ; a shelving shore and a firm bottom are good. When possible local enquiries should be made regarding the existence of quicksands, but if this cannot be done an examination of the shallow part of the river bed should be made by one or two selected men before any large number attempt the crossing.

The number of men to enter the water at one time must depend on the extent of suitable ground available for entering and leaving it. Until men and horses have been well trained in swimming together it is advisable, in order to avoid accidents, that the crossing should be carried out by half troops, and only under very favorable conditions by troops.

To guard against accidents a boat, if procurable, should be moored in the centre of the stream and a few selected swimmers should be held in readiness to furnish any assistance required.

These men should be furnished with sharp knives in order to cut at once any reins, &c., that might get entangled.

The men to cross the river must undress and, if ordered to do so, unsaddle their horses. The manner in which the clothing, &c., should be conveyed across the river will be explained hereafter. The bit should be removed, as the snaffle only must be used after the horse enters the water. The bridle must be carefully put on, so as to prevent the horse getting rid of it ; the throat lash must not be too tight, and to prevent the reins getting entangled it is advisable to fasten them to the mane.

The men enter the water naked on their bare-backed horses. The officers keep their proper places, and an interval of six yards is left between the front and rear ranks, and a distance of three yards between the horses. When the horse loses his footing and begins to swim, the rider must lighten his weight on the horse, and should do so by extending himself horizontally in the water, keeping a firm hold of the mane at the lower end near the withers and retaining the reins in his hand at the same time. In this position the soldier must swim with his legs and endeavour to get on the down stream side of the horse. He must press as little as possible on his horse, so that the animal may not have to support his weight, but simply to drag him along on the surface of the water. He must retain his hold of the mane and reins with one hand as above explained, and with the other should throw water in the horse's face should the horse endeavour to turn round towards the place from which he started, which not unfrequently happens. It is advisable for the soldier to get on the down stream side of the horse in order to guide him more conveniently and prevent him following the direction of the current. It also saves the soldier from being dragged under the horse by the force of the rushing water. On entering the river the horse should be guided slightly up stream, so as to prevent a too rapid start, and if he refuses to go on, is frightened and rears, then on no account should the reins be pulled or the horse shouted at; every effort should be made to encourage and tranquilise him by talking quietly to and making much of him.

It is a good plan to accustom the men to leave hold of the mane in order to seize the tail, which is necessary if the horse sinks very deeply in the water. It is also advisable to accustom them to leave their own horse occasionally, in order to seize hold of the mane or tail of a horse near them, under the supposition that their own is drowned. Whilst men and horses are learning to swim together, and until they acquire confidence, it will be as well to arrange for the best swimmers amongst the horses to lead, and for the best swimmers amongst the men to be placed down stream.

When sufficient boats or rafts for the conveyance of the men are available, the other method of swimming horses, namely in a drove, may be resorted to.

The bulk of the men, with the saddlery, are first taken across in boats or on rafts. Then the horses which have been left with the snaffle bit only should be driven in a herd into the river. Some good swimmers on horses which also swim well should lead, and it will be found that the horses will enter the water and swim more willingly when free than when they are accompanied by their riders. As the animals land on the further bank they are taken charge of by the soldiers and resaddled.

The construction of rafts for the conveyance of the men's clothing and the saddlery is only necessary when boats of sufficient capacity are not available. In the construction of rafts an officer's ingenuity will be brought into play. The common village charpoys form a good superstructure, which can be supported on small dug-outs, or earthen ghurrahs, the mouths being covered with any common cloth to prevent water being splashed in, on mussacks, or on kerosine tins, which in some villages in India and Burma will be found in large numbers.

If it be impossible to obtain materials on the spot for the construction of a raft, then the river should be crossed in the following manner: Some good swimmers cross first of all to the opposite bank, one of them taking with him a coil of thin rope, the end of which is fastened to a tree or boulder before he starts. This rope is used to establish a means of communication between the two banks. The men then make their clothing, accoutrements and arms into as compact a bundle as possible, which they fasten on their head or high on the shoulders as best they can; they then enter the water one by one, drag themselves by the hands along the rope and swim at the same time with their feet. Good swimmers should be told off to accompany men who swim badly so as to guard against accidents. This manner of crossing takes a long time, but it may be hastened by stretching several cords across parallel to one another. After the men of the first troop or squadron (with the exception of those required to accompany the leading horses) have reunited on the further side, their horses, fully saddled, should be sent across in a herd in the manner already described. It is necessary that careful precautions be taken to fasten all straps, reins, &c., so as to prevent the horses impeding one another when swimming side by side. The girths should be slightly loosened, the stirrups slipped up on the leathers, the bits removed from the horses' mouths and the rein fastened to the mane. The men leading the herd should be furnished with sharp knives, and be ready to cut any straps or reins which get entangled, and thus save the horses from drowning.

It is to be noted that it is impossible to direct from the bank of a river the movement of the men swimming across it, for the noise of the water and the neighing of the horses prevents not only the words of command from being heard, but also the trumpet sounds.

When a body of cavalry has to cross a river every man, whether he can swim or not, must accompany it. Time is lost in taking the extra precautions necessary to ensure the safety of men who cannot swim, and it is, therefore, necessary that all cavalry soldiers should be good swimmers. From the numerous experiments in swimming which have been carried out by large bodies of cavalry, it has been conclusively shown that *with proper precautions* no accident to man or horse need be feared.

When a native cavalry regiment has to swim a river, it will be often necessary that its camel sowars should accompany it. It is, therefore, desirable that the camels should be practised in swimming, and in doing so that the following instructions be attended to.

A rope must be fastened securely to the camel's head. The camel is led into the water, and the end of the rope held on a strong firm raft or boat, which is rowed across the river. When out of his depth the camel sometimes begins to swim, but frequently lies on his side and allows himself to be towed across. Care must be taken that the camel's head be held well above the water, close to the boat; the rope used need not be a long one. The tendency with camels is for the head to go under and the hindquarters to rise above the water; this can be counteracted by making their drivers sit astride on their rumps, which forces the hindquarters down and the heads up.

THE NORTHERN SHAN COLUMN.

Crossing the Namtu or Myitngé River at the Lilu ferry. By Captain A. C. YATE, *1st Beluchis, Intelligence Office, Northern Shan Column.*

The Northern Shan Column arrived at the Lilu ferry about 11-30 A.M., on the 11th January 1888. It was more than doubtful whether on arrival it would not be found that the inhabitants of the village had fled taking with them the ferry-boat or boats. With a view to this contingency a message had been sent to Thibaw requesting that boats might be brought up from Ta-ti to Lilu. On arrival at Lilu it was ascertained that, owing to the rapids, communication by water between Lilu and Ta-ti was impossible. It was known, however, that, if the worst came to the worst, there was an abundance of bamboos in the surrounding forest, from which a raft or rafts could be made. The inhabitants of Lilu did not run away, nor did they remove their boats. These boats were 3 in number, 2 large (*i.e.* about 30 feet long by 2 broad and 2 deep), and 1 small (*i.e.* 20 long, 1½ broad and 1½ deep). The latter was not discovered till the evening of the 11th. On the two former the men of the 43rd G. L. I. commenced operations about 11-45 A.M., on the 11th. They first fastened lengths of bamboo athwart them, then they strengthened their floating power by lashing stout bamboos, 30 feet long and 6 inches in diameter, lengthways along the outer sides, then they cut planks (which were fortunately ready at hand) to the required length (about 7 to 8 feet), and lashed them with straps and withies of split bamboo athwart the two boats, and finally undergirded the whole with strong drag-ropes borrowed from 1-1 E. D. R. A. The boat was then ready by about 1 P.M., and the work of crossing over commenced with the detachment Royal Munster Fusiliers and the Mounted Infantry. In the meantime another party of Gurkhas was hard at work constructing a bamboo raft. It was made entirely of bamboo—frame work, lashing, everything—except the flooring which was made of sized planks. The planks were lashed down to the framework with long strips of split bamboo. The boat carried about 15 men or 20 maunds of kit at a time; and the raft about 8 men or 10 maunds of kit. The raft measured about 12 × 12 feet. What is most to be noted about the construction of this boat and raft is that nothing was used but wood and bamboo. The two dug-outs and the planks were found on the spot and were of course utilised; otherwise rafts made, lashing and all, of bamboo would have been used. The under-girding of the boat with artillery drag-ropes was only a precaution not a necessity. The boat thus prepared was used for about 22 working hours and the lashing never once required tightening or re-adjusting.

The strength of the column and the weight of baggage that had to be conveyed across the Namtu was approximately—

580 Officers, fighting men and followers.

540 Mules and ponies.

1,500 Maunds of baggage, including pack-saddles of artillery and transport.

swim at the same time with their feet. Good swimmers should be told off to accompany men who swim badly so as to guard against accidents. This manner of crossing takes a long time, but it may be hastened by stretching several cords across parallel to one another. After the men of the first troop or squadron (with the exception of those required to accompany the leading horses) have reunited on the further side, their horses, fully saddled, should be sent across in a herd in the manner already described. It is necessary that careful precautions be taken to fasten all straps, reins, &c., so as to prevent the horses impeding one another when swimming side by side. The girths should be slightly loosened, the stirrups slipped up on the leathers, the bits removed from the horses' mouths and the reins fastened to the mane. The men leading the herd should be furnished with sharp knives, and be ready to cut any straps or reins which get entangled, and thus save the horses from drowning.

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A rope must be fastened securely to the camel's head. The camel is led into the water, and the end of the rope held on a strong [illegible] raft or boat, which is rowed across the river. When out of his depth the camel sometimes begins to swim, but frequently lies on his side and allows himself to be towed across. Care must be taken that the camel's head be held well above the water, close to the boat; the rope used need not be a long one. The tendency with camels is for the head to go under and the hindquarters to rise above the water. This can be counteracted by making their drivers sit astride on their rumps, which forces the hindquarters down and the heads up.

THE NORTHERN SHAN COLUMN.

Crossing the Namtu or Myitngé River at the Lilu ferry. By Captain A. C. YATE, *1st Beluchis, Intelligence Office, Northern Shan Column.*

The Northern Shan Column arrived at the Lilu ferry about 11-30 A.M., on the 11th January 1888. It was more than doubtful whether on arrival it would not be found that the inhabitants of the village had fled taking with them the ferry-boat or boats. With a view to this contingency a message had been sent to Thibaw requesting that boats might be brought up from Ta-ti to Lilu. On arrival at Lilu it was ascertained that, owing to the rapids, communication by water between Lilu and Ta-ti was impossible. It was known, however, that, if the worst came to the worst, there was an abundance of bamboos in the surrounding forest, from which a raft or rafts could be made. The inhabitants of Lilu did not run away, nor did they remove their boats. These boats were 3 in number, 2 large (*i.e.* about 30 feet long by 2 broad and 2 deep), and 1 small (*i.e.* 20 long, 1½ broad and 1½ deep). The latter was not discovered till the evening of the 11th. On the two former the men of the 43rd G. L. I. commenced operations about 11-45 A.M., on the 11th. They first fastened lengths of bamboo athwart them, then they strengthened their floating power by lashing stout bamboos, 30 feet long and 6 inches in diameter, lengthways along the outer sides, then they cut planks (which were fortunately ready at hand) to the required length (about 7 to 8 feet), and lashed them with straps and withies of split bamboo athwart the two boats, and finally under-girded the whole with strong drag-ropes borrowed from 1-1 E. D. R. A. The boat was then ready by about 1 P.M., and the work of crossing over commenced with the detachment Royal Munster Fusiliers and the Mounted Infantry. In the meantime another party of Gurkhas was hard at work constructing a bamboo raft. It was made entirely of bamboo—frame work, lashing, everything—except the flooring which was made of sized planks. The planks were lashed down to the framework with long strips of split bamboo. The boat carried about 15 men or 20 maunds of kit at a time; and the raft about 8 men or 10 maunds of kit. The raft measured about 12 × 12 feet. What is most to be noted about the construction of this boat and raft is that nothing was used but wood and bamboo. The two dug-outs and the planks were found on the spot and were of course utilised; otherwise rafts made, lashing and all, of bamboo would have been used. The under-girding of the boat with artillery drag-ropes was only a precaution not a necessity. The boat thus prepared was used for about 22 working hours and the lashing never once required tightening or re-adjusting.

The strength of the column and the weight of baggage that had to be conveyed across the Namtu was approximately—

580 Officers, fighting men and followers.

540 Mules and ponies.

1,500 Maunds of baggage, including pack-saddles of artillery and transport.

The crossing commenced about 1 P.M., on the 11th, and was completed at 2-15 P.M. on the 13th. The small dug-out was not used at all. The raft was only used for about 6 to 7 hours for the conveyance of men and baggage, for a reason to be given hereafter. As said before the boat actually worked for about 22 hours. It took the boat 12 minutes and the raft about 16 minutes to make one trip. All the animals swam across. The river is 100 yards broad, 20 feet deep (banks shelve rapidly) and current gentle.

The crossing was effected with only one accident. The swimming across of the battery mules and Mounted Infantry was only carried out with much toil and trouble; but the transport mules and ponies went gaily across in batches of from 10 to 40. The Shan pack-bullocks always swim rivers and think nothing of it. It took 3½ hours to get about 40 Mounted Infantry ponies across. Owing to the heavy mist in the Namtu valley in the early morning it was impossible to begin work before 7-30 or 8 A.M. Work ceased about 6 P.M., when it was quite dark. Thus we had the following working periods :—

For the boat.

11th, 1 P.M. to 6 P.M, = 5 hours.

12th, 7-30 A.M. to 6 P.M. = 10½ hours.

13th, 7-30 A.M. to 2-15 P.M. 6¾ hours.

TOTAL 22¼ hours.

For the raft.

11th, 2 P.M. to 3 P.M. = 1 hour.

At 3 P. M., owing to an accident, caused by attaching to the boat too many Mountain Infantry ponies (to swim across) and by the want of presence of mind of the persons on board, it, the raft, was struck off carrying work and used on the 11th and 12th solely for rescuing the kit that had gone to the bottom.

13th, 7-30 A.M. to 1 P.M. = 5½ hours.

Total 6½ hours.

Thus the boat worked for 22¼ and the raft for 6½ carrying hours; and consequently (on the data already given) the boat should have made 111 trips and the raft 26 trips. The two together are equivalent to 126 trips of the boat. The approximate strength of the column and weight of baggage was 580 of all ranks and 1,200 maunds. According to the data given above, the boat should have been able to convey that number of persons and weight of baggage across in 114 trips. The difference in the estimated and the actual must be sought in the facts that some trips lasted more than 12 minutes, that there were occasional delays (such as that caused by the capsizing of the boat), and that the weight of baggage, ammunition, stores, transport, gear, treasure, rations, &c. can only be given approximately.

I have thought it worth while to give these details about the time taken by the Shan column in crossing the Namtu, because it was the subject of some discussion among the officers of the column prior to the actual event. The number of officers in the Army who have practical experience of conveying troops by ferry and animals by swimming across rivers are few. Still fewer are those who know what certain classes of natives of India can do in improvising boats and rafts from material procurable on the spot, without any extraneous aid or material. I regret that I cannot enclose drawings of the boat and raft that I have endeavoured to describe. There is no doubt that the passage of the column would have been quicker, (1st) had the boat not been upset, thereby necessitating the expenditure of some 12 hours in fishing up out of 20 feet of water and one or two feet of mud the muzzle, carriage and wheel of a screw-gun, several rifles, and some kits, and (2nd) had a second or even third raft been constructed. The actual time taken was 50 hours or 22 working hours; but under no circumstances could the crossing have been effected before sunset on the 12th, *i.e.* in less than 15 working hours, because the 540 animals of the column could not apparently under the most favorable circumstances have been induced to swim across in less time. Willing as the transport mules were to swim across, an interval of from 10 to 20 minutes had to be allowed between the passage of each batch, in order to give the drivers time to secure and picket each as it arrived. In the passage of the men and baggage greater rapidity was attainable, but in that of the animals scarcely. It is to be noted that not a single animal was lost.

Extracts.

"MILITAR WOCHENBLATT"—11TH JANUARY 1888.

Cavalry Manœuvres in the Odessa District, August 1887. *From the Russian "Invalide" No.* 244.

Object of the manœuvres:—Strategic instruction for the Cavalry to conclude with an attack in mass on the enemy's flank and rear.

The troops taking part were the 7th and 8th Cavalry divisions with their Horse Artillery and the Cadets of the Jelissawetgrade College. Total 46 squadrons (sotnias) and 24 guns.

The manœuvres lasted from the 7th to 12th August, with one day for rest. They were conducted by Lieutenant-General Allen, Commander of the 7th Army Corps.

Telegram from the Officer Commanding the district to the Commander.

"*The first half of the manœuvres is to be devoted to the protection of the strategic front and the discovery of the strength and line of operations of the enemy.*

When this has been carried out the attack on the enemy's rear and flank is to be proceeded with, but during these operations the strategic front is not to be unguarded. During the second half of the manœuvres the protection of the front will be carried out by a skeleton force, in order to allow of more troops joining in the actual attack.

As far as possible only advanced guard engagements are to take place.

In deciding the result of an encounter, the condition and freshness of the opposing forces will be especially considered."

Composition of the forces.

Eastern force.—Commander Lieutenant-General Bodissko. Strength 28 squadrons and 12 guns.

Western force.—Commander Lieutenant-General Borosdin. Strength 18 squadrons and 12 guns; also (imaginary) 16 battalions, 4 squadrons and 32 guns.

Idea.—The main body (imaginary troops) of the western force are occupied at Bender until the 10th of August, when they are to commence their march on Odessa. (This is practically a flank march, with left flank exposed.) The cavalry of the western force are to protect the advance of the main body, and at the same time to push forward in the direction of the enemy to ascertain their strength and intentions.

The cavalry of the eastern force, whilst protecting the advance of their (imaginary) main body on Wosnessensk, are to attack the enemy's cavalry with the object of driving them back and obtaining information on the strength and position of their main body.

Operations.—On the 6th August the main bodies of opposing cavalry were about 150 versts (100 miles) apart; the eastern force occupying Jekaterinowka and the western Frendenfeld.

On the 7th and 8th the eastern force advanced to Mosstowoje, Liachowo and the western force remained stationary. The 2 forces had now got touch of each other.

The 9th a rest day.

This concluded the first half of the manœuvres.

The idea for the second half was:—the eastern force to attack the left flank and rear of the enemy in as great strength as possible, at the same time protecting the advance of their (imaginary) main body. The western force to repulse the attack of a stronger force on its flank and rear.

For the above purposes the eastern force had 20 squadrons and 10 guns available, and the western 16 squadrons and 10 guns.

The remainder of the respective forces were used as skeleton troop to protect the front.

Before the advance the following arrangements were carried out in the eastern force. All weak men and horses were told off to protect the front. Every man received a 3 days' ration of biscuit and groats and about 2 pounds of cooked meat. A daily ration of oats was taken in the corn bag for the horses. Besides this, in the wagons with the troops, was 2 days meat and preserved vegetables, each wagon carrying 2 days' provisions for 2 squadrons One change of linen only was taken and the second pair of boots and socks was left behind.

On the 10th and 11th of August the eastern force continued its march for the purpose of getting round the enemy's left flank, and the western force retired on its main body, which was now supposed to have made two marches towards Odessa.

On the 12th the eastern force continued its march, with the object of attacking the flank and rear of the enemy. The main body of the western force made another march in the direction of Odessa and their cavalry followed them with such rapidity that they lost touch of the enemy in the morning.

The operations were brought to a conclusion with the decision that the eastern force had failed in its endeavour to attack the flank and rear of the enemy within the prescribed time.

In the last 3 days of the manœuvres the eastern force covered 158 versts (105 miles); this advance was not made by roads but chiefly across a country whose nature was constantly changing.

In the eastern force 1 horse died and 51 were unable to continue the advance. 16 per cent. were laid up.

In the western force 1 horse died, and 11 per cent. were laid up.

The total casualtics of horses was about 14 per cent. But it must be remembered that several horses were taken on this march which were shortly to be passed out of the ranks. This should reduce the above percentage by $\frac{1}{3}$.

"MILITAR WOCHENBLATT"—11TH JANUARY 1888.

The augmentation of the French Cavalry.

Four out of the 13 new Cavalry Regiments were raised on the new establishment on October 1st, *viz:* 27th and 28th Dragoons and 5th and 6th Chasseurs and 1 Afrique. This new establishment is at present only an experiment, which if successful will be applied to all the Cavalry,

The changes extend to a reduction in the number of officers and the amount of free horse rations allowed to them.

In future the regimental staff will be reduced from 5 to 3 officers. A Colonel will command instead of a Lieutenant-Colonel and one "Chief d'escadron" (staff officer) and the "capitaine instructeur" will be reduced. The "capitaine eu second" will be abolished, so that a squadron will have 5, instead of, as formerly, 6 officers.

The Commanding Officer will get ration for 3 horses, the two staff officers for 2 each, and the remaining officers only for one.

It is proposed to extend this reduction of free forage to all officers including generals.

The peace establishment of the new Regiments of 5 instead of 6, squadrons will be:—

3	Staff officers	with	7	horses.
34	Other officers	with	34	horses.
182	Non-Commissioned Officers, etc.	with	161	horses.
610	Privates	with	520	horses.
829			722	

The introduction of the new scale of establishment and reduction of the 6th squadron has enabled the War minister to raise the 4 new regiments and thus to complete the formation of the 3rd Cavalry Division. This will be made up of the two Hussar regiments from Algiers (2nd and 4th) the 6th Cuirassier brigade and the 2 new Dragoon regiments (22nd and 28th). The division will be quartered thus:—

Divisional staff—Chalons gur Marne.

2nd Hussar Brigade, Staff, Chalons gur Marne.
  2nd Regiment, Chalons gur Marne, Depot, Camp de Malons.
  4th Regiment, Sampigny, Depot, Vitry le Français.

5th Dragoon Brigade, Staff, Chalons gur Marne.
  27th and 28th Regiments, Camp de Chalons.

6th Cuirassier Brigade, Staff, Chalons gur Marne.
  11th Regiment—Niort.
  12th Regiment—Angers.

With respect to these changes the Militar Wochenblatt is unable to see how the squadron commander will be able to carry out his mainfold duties, with only one charger—more especially as through the reduction of the "Capitaine Instructeur" the instruction of the squadron will now devolve on him also.

There are now 82 Cavalry Regiments in France, 72 on home service and 10 in Algiers.

Notwithstanding the augmentation in the Cavalry it must be remembered, says the Wochenblatt, that even with an establishment of 104 horses per squadron, they are only able to attend the annual manœuvres with 90 horses each and that too with only 4 squadrons per regiment taking part. This is in consequence of the large number of untrained horses in each regiment.

"MILITAR WOCHENBLATT"—4TH JANUARY 1888.

The French Pontoon Regiments.

The French War Department intend to alter the organisation of the two Pontoon Regiments (which are now quartered in Avignon and Augers), in so far as to separate them from the Artillery and make them a part of the Corps of Engineers.

After the transfer has been effected it is intended that the 3 first companies of each regiment shall become Sappers and Miners and the 4th companies will be retained as Pontoon companies. These Pontoon companies will be a special branch of the Engineers and their instruction in bridging, &c., will be carried on apart from that of the other companies.

The Pontoon companies will be quartered with the Engineers, whose Stations are Versailles, Arras, Grenoble and Montpelier. The fact that these towns are none of them situated on a large river, is considered by the Wochenblatt to militate against the proposed scheme.

"MILITAR WOCHENBLATT"—4TH JANUARY 1888.

AUSTRO—HUNGARY.

Arrangements for moveable Electric light.

The object in view is to light up by night the embarking and disembarking of troops on the railway, as well as to enable other work to be carried on there at night.

The experiments were conducted at the Austro-Hungarian autumn manœuvres, during which, on the 20th, 21st and 22nd September last, 45,000 men were entrained at Peski on the Hungarian State Railway.

The "Vedette" of 12th October refers to another experiment, which took place at Kornenburg. The electric light wagon, property of the Railway Regiment, consists of a locomotive of 7 atmospheres and a Dynamo; in a second, smaller wagon, are the necessary materials, such as wire, cast-iron poles and the glass globes for the arc lamps.

Another experiment is referred to, which took place on the 10th October, at the goods station of the North-West Railway at Vienna. The necessary electricity for lighting 8 arc lamps, and as many incandescant lamps was here supplied by an 8 horse-power locomotive, on which was a dynamo. An extra truck wagon carried the electric cable to its respective lamps, and on it also were the arrangements for regulating the current and lighting and extinguishing. The lamps, brought on bamboo supports, each lit up a circle of 150 metres diameter. Every thing connected with the telegraph—poles, implements, lamp, &c. as well as the 8 rolls of wire cables, were carried on an extra truck.

R. S.

EXTRACTS.

"Revue du Cercle Militaire," May, 1887.

(*I.*)—*Reorganisation of the Spanish Army.*

By the new law about to be introduced service is obligatory at 20 years of age. In the European army service is for 12 years, in the Colonial army for 8 years. In the former 3 years will be passed with the colors, 4 in the first reserve and 5 in the second reserve.

The men for the Colonial army are drawn by lot, but substitutes may be obtained on payment of 2,000 francs. Service in the Colonies is for 4 years. Young men who pass a certain examination need only serve for 1 year in the ranks on condition that they pay their own expenses.

(*II.*)—*Orders relative to night operations.*

Orders have been issued in the French army for troops to be exercised by night at least once a week. Such exercises will consist of route marching, outpost duty, reconnaissances, dispositions for attack, attack of a post, etc. These exercises will, at first, be conducted by companies, and later on by battalions or even larger bodies. As a rule they should be carried out during the latter half of the night so as to terminate at sunrise.

It seems a pity that British troops are not practised more in night operations, as there can be little doubt that night attacks will become more common as firearms improve. The army which is habituated to such exercises will start with a decided advantage in its favor. Weekly repetition of these exercises seems needlessly harassing, but once a month would not be unreasonable.

(*III.*)—*German losses in* 1870-71—*June,* 1887.

There has been a good deal of discussion of late in certain Indian journals regarding the losses inflicted by the sabre in modern war. The Red Cross Society have lately published some statistics which will be interesting. The total German losses in killed and wounded during the war were 98,233, of which—

	0·7	per cent.	by the bayonet.
	1·2	„	by lance or sword.
	98·1	„	by firearms.
Of the last	8·4	„	was from artillery fire.
	91·6	„	„ musketry.

The most bloody battle was that of Mars la Tour, where the losses were 16·8 per cent. of the 83,567 combatants present, while at Sedan the losses were only 3·08 per cent.

(*IV.*)—*The Colonial Army in the Dutch Indies.*

The *Revue* gives some interesting information on this subject.

On the 1st January, 1886, the Colonial Army mustered 29,049 men, or rather more than 1 per mille of the population of the Dutch Indies, very much the same proportion that we maintain in India.

Half the force are Europeans, half natives, whereas with us the proportions are 1 to 2. It is made up as follows :—

Dutchmen	7,494	Total Europeans	13,680
Germans	2,412		
Belgians	1,391		
Half castes	1,268		
French	564		
Swiss	461		
Miscellaneous	90		
Amboynese			1,661
Other Natives			13,618
Africans			90
		Total	29,049

The officers are nearly all of Dutch origin, or at least naturalised. The composition of the army is as follows :—

Cavalry	885
Artillery	2,595
Engineers	587
Medical	1,217
Infantry	22,560

The Infantry consists of—

4 Depot battalions.
18 Service „
10 Garrison „
4 „ companies (detached).

In the infantry Europeans and natives are mixed usually in the proportion of 1 to 2.

It is the policy of the Dutch to keep the Amboynese quite distinct ; thus in five battalions there are two class companies of Amboynese. They are specially favored, being equipped like the Europeans. They owe this to their proved loyalty and to the fact that they are mostly Christians. In the garrison battalions the natives are more numerous, being about 3 to 1.

(*V.*)—*Garrison duty during winter in the Russian Army.*

It may be interesting to some of us, especially to the British soldier, to know how the Russian soldier lives during half the year. No. 32 of the Revue du Cercle Militaire gives us some details on this point.

After the autumn, or rather summer, manœuvres a slack period of 6 or 8 weeks sets in. Only the number of men actually required for garrison duty remain with their battalions ; the rest are given leave in order that they may obtain work in civil life. The Russian soldier only clears about 5 roubles a year, which is certainly not more than 15 shillings, and, as this modest sum is quite insufficient to meet even the Russian private's little wants, he is encouraged to earn money in civil life by day labour in the fields on the railway or in factories. It is found that this custom has a very bad effect on discipline, and yet two months thus passed only bring the soldier about 10 roubles ; the remainder is distributed among the men who remain at duty, and who thus have extra work thrust upon them, or credited to the company funds, which are employed in improving the men's diet. The men return to their regiments about the beginning of October, and from then till May instruction has to be confined to the barracks owing to the severity of the climate. Guard duty in the big towns is very severe, every man being on duty once in three or four days. Owing then partly to the paucity of men for parade, and partly to the climate, for half the year the instruction is confined to manual and bayonet exercises, position drill and gymnastics, practice with the Russian equivalent for the Morris tube, and, for those who require it, instruction in reading and writing.

Six selected N. C. O's and men per company are placed in a special section, and instructed by selected officers in certain theoretical and practical courses. The results obtained therefrom are excellent, but, on the other hand, owing to their youth and inexperience, the Russian N. C. O.'s have very little influence. Besides ordinary military duties 10 men per company are taken for the regimental workshops to assist in making up the annual clothing, so that, even when a company is not on guard, there are seldom 20 men available for parade. During May a large number of men are employed in the regimental kitchen gardens, so that practically there are only three summer months during which the men can be properly instructed in company and battalion drill, field manœuvres and target practice, but during that period an immense deal of good work is done.

(*VI.*)—*The Italians in the Red Sea.*

Italy has found it necessary to organise a special force for service at Massowah, etc. In this force only soldiers and reservists will be allowed to enlist. All candidates must be Italians. must be unmarried, medically fit for African service, and of good character. The Italian authorities insist on "old soldiers."

Sergeants must be 32 years of age.
Rank and file of cavalry and artillery, 28 years.
Do. infantry, etc., 26 years.
The minimum height insisted on is 5 feet 2 inches

Soldiers in Africa are to get free rations, or 1 franc per diem in lieu, and pay at the following rates :—

	Franc.	Centimes.
Sergeant	1	25
Corporal	...	35
Bugler	...	30
Private	...	20

That is to say a private gets free rations and about Rs. 3 per mensem. Time served in Africa is to count double. Bonuses on enlistment are also given.

The special African corps will consist of—

	Officers.	Men.
Staff, etc.	40	85
2 Regts. (6 battn.) Infantry	146	3,420
1 Squadron Cavalry	6	150
4 Companies Artillery	24	572
1 Company Engineers	6	185
Non-combatant services	16	350
Total ...	238	4,762

The troops will be served out with a sort of *khaki* uniform.

E. G. B.

THE SECRETARY UNITED SERVICE INSTITUTION OF INDIA SIMLA.

SIR,

May I be allowed to propose that a certain part of the United Service Magazine be devoted to short letters on Military matters from Officers, either members or not, of the institution, which letters are now sent to the "———" and other Indian papers, many of which are rather out of place, in any but a service paper a service paper. I do not mean letters about grievances and such matters, but there are many officers and others who are either unable for various reasons, or disinclined, to write papers suitable for Magazine articles, but who would like to give expression to their ideas and invite discussion on them, in short letters, such as are occasionally to be found in the daily papers on musketry, attack formation, reserves &c., and have at present no chameel for such correspondence except these papers. In any letter for publication the name of the writer should of course be sent, but I would propose that he should have the option of this not being published a Nom-de-plume only being attached in the Magazine. This would give officers diffident as to the value of their ideas, and officers doubtful as to the correctness of their views, but anxious to obtain the opinion of others on them, the opportunities they wish for. Some one would of course have to reject unsuitable letters. I think this would cause more officers to take an interest in the magazine.

I enclose a specimen of such a letter as I mean, others with a bent for writing papers might get ideas from such correspondence and work then out.

DEAR SIR,

I wonder if it would be a good thing to teach our Sepoys, on the march to and from some camp of exercise for instance, to carry their own kits. The arrangements for transport in the Indian army are far more like the various continental systems than they were 15 years ago even, but we are still very much hampered in this respect. I have heard that in Tonkin the French soldiers carried every thing themselves, tents, cooking pots, and even part of their rations, when going on expeditions. By good management we have never yet found ourselves reduced to such extremities and have been able to save ourselves from the great wear and sickness from which the French suffered. Thus in a war, regiments or even brigades and divisions may be called on to move at a moments notice, leaving every thing possible behind except ammunition and entrenching tools, and experience in carrying their kits and cooking things would be useful to the men. Then again in moving large bodies of men and quantities of supplies, transport is very likely to be deficient, or grazing for the animals not to be found, and some such expedient would have to be resorted to. In any case a General would feel his hands much freer with troops under him experienced in marching with a minimum of transport. Incidentally, such a system would ensure no useless over weight kit being carried. Of course sepoys would only be called on to do this when necessary, and their strength and health kept up as much as possible. I don't know what is necessary in the way of valise or knapsack, but should think an arrangement of straps by which the kit could be fixed upright and well up on the back would be the best. Field kits carried for half marches would be sufficient at first. A trial would at all events settle the question as to how far it is practicable in cases of emergency. At present this must be doubtful to many, but it seems to me pretty certain, first, that our sepoys are as strong and as good marchers as the French infantry men: second, that the cold weather climate of India is as good as any in Europe, and far better than that of Tonkin; and third, that in a great war such an emergency will arise.

BAYONET.

From the Secretary United Service Institution of India to "Bayonet."

Dear Sir,

In reply to your letter of the 25th November, I am desired by the Council to inform you that the matters brought forward in your letter are already provided for in the Revised Regulations of the Institution issued last year, a copy of which I send you for ready reference. From Section [illegible]II. para 3 (*g.*) and (*i.*) you will observe that "when procurable, short notes on Professional subjects, and Correspondence on Professional subjects are published in the Journal. The Council would be very glad to see officers utilise the pages of the Journal, more than they do, for the Ventilation of their views on professional matters, in the shape of such notes and correspondence as you refer to; but it is because officers send their contributions on professional subjects to the daily papers, that they are not "procurable" for publication in the only Service Magazine in India.

On page 7 of the Regulations you will find that contributors may write under a "Nom-de-plume" if they like, and all papers must be passed by the Executive Committee before publication.

The Journal

OF THE

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VOL. XVI. 1888. No. LXXI.

LECTURE ON THE WAR GAME, ITS USE &c.

DELIVERED AT KAMPTEE on 17TH APRIL 1888,

BY BRIGADIER-GENL H. M. BENGOUGH. C. B., COMMANDING NAGPORE FORCE

Gentlemen and Soldiers :—

I have invited you to meet me here this evening that I might introduce to your notice the War Game. I dare say that some among you here present who may have been lately at Aldershot, or indeed at any of the larger stations in this country where the game has been introduced, may be already acquainted with the game: if so I am sure that they will join with me in assuring the others of you who have not seen the game played, that there is no mystery about it, that there is no especial difficulty in learning to play it, that there is no greater knowledge of field movements necessary than is possessed by any subaltern of three or four years service combined with the power of reading a map. The best proof of this that I can give you is the fact that two years ago at Bangalore I saw a capital game played between two Non-Commissioned Officers, a Sergeant of Royal Horse Artillery and a Sergeant of 12th Bengal Lancers. The forces were of course somewhat reduced to meet the capabilities of the players, (I think that there were two squadrons on either side) and a simple tactical problem given.

The game was well played, the scouting intelligently carried out, the ground duly studied and the men kept well in hand, thus avoiding a very frequent error of young players of the game viz.,—undue dispersion of their force.

What has perhaps tended to invest the game with the character of being technically difficult to master is I think the "Tables of Odds" that are inserted in the pamphlet of Rules. They are intended to represent the element of chance that is so often present in warlike operations, and also to decide arbitrarily by the throw of dice the numerous minor questions of detail that will be found to so frequently call for decision in the course of a game. Thus to take the case of two squadrons of cavalry of equal strength colliding, the actual result would depend greatly on such points as, the respective fighting qualities of the men, the ground on which the charge was delivered, the pace, the arms of the combatants. These extraneous points it is attempted to solve by the "Tables of Losses," Similarly such questions as, Can infantry advance against hostile infantry posted on flat open ground?

Can Cavalry or Artillery debouch in the presence of Artillery in action?

How many guns would artillery lose limbering up in presence of hostile infantry.

Is such and such a swamp or wood passable for cavalry or artillery? All such questions it is proposed to refer to the same arbitrament. This however is not necessary. An umpire's decision can be accepted on such matters in the War Game, as it is indeed at field manœuvres. I do not therefore propose to use these tables for the games which I hope to see played here, and I have omitted them in the copies of Rules which I have had printed for your use.

You may wish to know something as to the origin of the game. I have no very definite information to give you on this point. It came to us, as its original name "Kriegsspiel" tells us, from Germany, like many another practical military invention. Speaking from memory I believe that it was invented by a Captain in the Prussian Army some time before 1870 and was warmly taken up by General von Moltke then chief of the Kreigschule at Berlin, and introduced as a means of instruction for the General Staff. He is said to have been fond of playing the game himself and it is quite possible that those farseeing strategic combinations by which the French Army was so rapidly overwhelmed, had their origin on the Kriegsspiel maps. The game is now in general use in the War Schools on the continent. It was introduced at Aldershot some 20 years ago, and has lately been revived there, and the rules revised. I remember myself playing a game there some 17 years ago, and in somewhat distinguished company. The game was originally arranged between Captain Fitz George, 20th Hussars, and myself, but H. R. H. the Duke of Connaught, then better known as Prince Arthur, who was at Aldershot doing duty as Captain in the Rifle Brigade, expressed a wish to join in the game. Captain Fitz George accordingly accepted H. R. Highness' services as an Infantry Brigadier, whilst I took the opportunity of providing myself with a Cavalry Commander in the person of Lieutenant Frank Barrow, at that time Adjutant of 19th Hussars, who afterwards proved himself so brilliant a Cavalry officer, and whose loss we have to deplore in the Soudan campaign. I remember that my opponent experienced some difficulty in proving a mission for his illustrious subordinate at once of sufficient importance, and not likely to jeopardize his own plans, for H. R. Highness' war experience was of course at that time rather limited. Eventually he was entrusted with the command of a detached Brigade, with instructions to turn my left flank. My *rôle* was a defensive one and I remember the whole details of the position, which was on the Hartford Bridge Flats just near the Blackwater Valley, as if the game had taken place only last week, for my left flank was one of those difficult tactical problems which so often presents itself, a detached wood, about 800 yards from my left flank. Should it be held or not? I decided on not holding it and H. R. Highness got into that wood and made it rather disagreeable for me. The umpire considered that I was wrong in not holding that wood and I dare say that he was right, but I obtained a Verdict having successfully maintained my position. I remember that special mention was made of the manner in which the Cavalry on both sides was handled, the credit for which was of course due to the two Cavalry Officers who specially commanded that arm.

At this time the Game was played pretty regularly at Aldershot and it was the custom to drop in at the Club House and watch the progress of the games. I remember coming in one evening and finding a gallant Colonel of Artillery raging about the room very wrathful, and using very unparliamentary (in the old sense) language at having been deprived of his guns by the Umpire. I only mention these incidents to show you that the game possesses a keen interest for players.

Now I fancy I hear some of you asking me. "Well but what is the practical use of the game." "Will it make a man a good soldier?" I am unable to answer that question in the affirmative. But what, I would ask, will make a man a good soldier? Will garrison classes, will the Staff College? Certainly not the former I fear, and I dare say that some of you here may have known not a few third rate soldiers who have graduated at the College. But let us think for a moment what a good soldier is, of what a rare combination of mental, moral end physical qualities he must be composed. Shall we not be driven to the conclusion that he like the poet "is born not made?" Not that I should wish you to conclude that study is not necessary for his perfection. Far from it. We have the witness of History to the contrary. All the worlds greatest warriors, Cæsar, Hannibal, Frederick, Napoleon, Wellington, Von Moltke, have been noted for their complete knowledge of every detail in the art of war. Napoleon used to explain his gift of never failing resource in all the changes of a campaign or battle field, by his having previously thought out all possible combinations that could present themselves. Thus, it is related, that in that ever memorable exploit when he passed his army over the apparently impenetrable defiles of the Alps, descended on the plains of northern Italy, and won a brilliant victory over the Austrians at Marengo, every detail of the expedition was personally supervised by himself, down to the very nails in the horses shoes. Wellington too we know from his published despatches to have been a very master of detail. But after all what is genius? Has it not been defined as "an infinite capacity for taking pains?" And if, gentlemen, study was necessary for proficiency in the art of war in those days, is it not fourfold more so now-a-days? Is not the yearly increasing attention paid by all nations to this study evident? I am myself particularly interested in watching the progress made by nations in this respect, and it is remarkable how countries formerly considered backward in military science have shot up into the van of military reformers. Thus Russia perhaps at the present time takes the lead in prosecuting warlike experiments, Italy has an army theoretically nearly perfect, whilst little Belgium claims the credit of alone having successfully solved the problem of a model attack formation. May we not be behind hand. We have most of us seen Sir Charles Dilkes picture in the last Fortnightly Review of the typical "society" officer, an individual "with the brain power of a primeval ancestor and the habits of a gamekeeper." We know that that picture is no true one of the officer of the present day. Let us so act so that it shall be not only untrue, but impossible. Let us recognize the importance of this question. Some one has said that "ignorance in a commander is criminal." Let me read to you a few lines from a speech lately made by Major-General Brackenbury, R. Artillery to the London Volunteers, at the Royal United Service Institution. He quoted Napier and showed the disastrous effects of ignorance of war in leaders, and continued. "If we lose our counters at baccarat or poker we may hide our disappointment and buy others, or go without: but war is a terrible game where the stakes are our country and the counters we play with the lines of men. I have studied earnestly, and meditated long and deeply on war, and when I think of all this I tremble at my own deficiencies." If these, gentlemen, are the words and feelings of a scientific officer who has devoted his time and talents to his profession, what must, or ought to be, our feelings who are comparatively amateurs in the study of our calling?

What then does the War Game teach? Well it teaches us among other things *to read a map*, not an unimportant attainment. Most of us can read a map up to a certain point as for instance so far as to enable one to find one's way from say Kamptee to Jubbulpore, and some of us lately with the help of the Southern Cross and a compass succeeded in finding our way across country at night, but that is not the sort of reading that I refer to. To read a map with a military eye is to recognize how each feature whether hill or valley, swamp or plain, wood or stream, affects the position of troops for attack or defence. An officer on casting his eye on a map should be able to say at once, as it were by instinct, how he would take up a defensive position here, how he would make an attack there. I was much struck with an example of map reading that came under my notice last year, showing what can be effected where experience combines with love of the subject. I was contemplating some tiger shooting in the Balaghat District, and was trying to obtain some information about the best ground from Mr. Thompson of the Forest Department at Raipore. On my showing him a map of the district, he said that he had never visited the place but that on looking at a map he could put his finger on the spots where tigers would be found; and Mr. Thompson is not a man who exaggerates. Those of you who are hunting men must have aften amused yourselves as you travelled in a railway carriage through the country at home by imagining that you were crossing the country with a pack of hounds, and fancying how you would pop over that fence, slip through this gate, how you would get into this field and how you would get out of that. Very easy going is it by the way out of the window of a railway carriage! Well this is what a soldier should do; in all his walks and rides he should get into the habit of as it were insensibly noticing the features of the ground as they effect the positions and movements of troops.

2ndly the War Game teaches *the combined use of the three arms.* Junior Officers may say "Oh I am never likely to have the command of a combined force." Who can tell. But apart from, that I want to show you how a due appreciation of the action of the sister arms is of immense value in teaching you to understand the full value of your own arm. Now as a rule each arm devoutly believes that it is its own action that is mainly instrumental in winning a battle. This is called "esprit de corps" and is an invaluable motive power if properly applied. Thus it is quite right that each arm should consider itself invincible; cavalry should believe that they can ride down infantry and gallop through batteries, artillery that they can decimate an enemy at long range, and hold their own with case shot at short ones, whilst infantry content themselves with the modest statement, that they are the backbone of an army and that the "auxiliary" arms as they call them, are all very well and very pretty, but in comparison to themselves, almost superfluous. Now this, though a praiseworthy feeling for the rank and file, is fatal as the belief of a commander. The mutual support of the the three arms is the essence of combined tactics. It is the spirit of discipline extended to an army. What is discipline? It is not merely obedience. It is something more than the "Go and he goeth, do this and he doeth it" of the Roman centurion. This is the outward sign, but the inner spirit is something much deeper. Discipline has been defined as that feeling that assures every individual in a company, battalion or army that, in all his actions, he will be supported by each other individual in such company, battalion or army, thus endowing one man with the moral power of a thousand. So should it be with combined tactics. Each arm, each individual of that arm, should feel that success depends on the mutual aid of the other arms. Thus cavalry when scouting to the front, driving in the enemies outposts or scattering their horsemen, should feel that they are paving the way for their comrades of the artillery and infantry. The Artillery again as they set themselves to silence the enemy's guns, or accompany the infantry to the verge of armed rifle fire, should remember that their object is to enable the infantry to settle the fight at close quarters, while the infantry themselves should not forget that without the assistance of the sister arms they would never, or at least only with greatly increased loss, succeed in getting within decisive distance of their foe, and they should as jealously defend and as heartily trust in their comrades of the other arms as in those of their own company, or battalion. Then indeed is the moral strength of each arm trebled. Here I would say a few words on the question of the new infantry drill which is about to be adopted as it effects discipline. I suppose that the changes will be in the direction of a more open order of drill and greater simplicity of movement, and perhaps of words of command. I hope that it will not go too far in either direction. I am strongly convinced of the continued necessity for what H. R. Highness the Duke of Cambridge used to lay so much stress on,—"steady drill," and this as a motion of pure discipline, teaching men to move steadily together under the eye and personal command of a single individual, their commander, and creating that feeling of mutual support of which

I have just spoken; and I think that these formal movements in close order are if anything the more necessary now that dispersed order has become the normal fighting formation. No doubt but that most, I might almost say all, of the drill book formations are inapplicable to a field of battle, still if drill is to be considered as a powerful aid to discipline as I have urged above, a certain variety of movement must be retained. Men and officers would soon become weary of simply forming line from column and column from line. Doubtless many of the elaborate manœuvres that were practised in my ensign days have been rightly abolished. There used to be a pet movement of smart Commanding Officers called "Change front to the rear by the wheel and countermarch of subdivisions round the centre" which is now performed by the simple command "Change ranks." No one regrets the decease of such a drill monster as the above. Simplicity no doubt is to be desired, but I hope that we shall stop short of the standard of our Trans-Atlantic cousins, who delight in such expressive though rather primitive commands as "String out" "Coil up," or we may arrive at the beautiful simplicity of the typical command of an American General "Change front to the East on the North Star and darn ye!"

Another point that the War Game teaches is *the knowledge of the effective power, pace &c., of troops of all arms.* A want of experience in handling the three arms induces a greatly magnified estimate of their powers; cavalry are endowed with the power of flight, artillery can destroy anything from a battalion to a field work in a few minutes, infantry can march for ever and decimate an enemy in a few volleys. These errors lead to an undue dispersion of troops, so common a fault as I have already noted at field days, where commanders as a rule attempt too much. The War Game corrects this tendency, as an over ambitious commander will soon find himself minus a squadron or battery removed from the board by the umpire, and thus learns caution.

4th.—The War Game teaches a Commander *to make definite plans and to adapt his designs to an enemy's movements.* It is by no means an easy matter to draft out definite plans, complete in every particular for the attainment of a given object, and still less easy to modify them as circumstances may demand. The orders for his Force, which each player is required to send to the umpire before the game begins, is excellent practice in the former respect, and many occasions will generally occur during a game demanding some modifications of the original plan. General Grant who by good generalship combined with superior numbers brought the great American Civil War to a close in 1865, used to say that his principle was to find out all he could about the enemy, and make his plans accordingly without laying awake all night devising imaginary plans for his opponent. And here let me recommend to you the study of the American War. There is something about it that interests one at least more than the more recent campaigns between Germany and France or Russia and Turkey. Perhaps this feeling is due to its having been waged by an English speaking people, or perhaps from the very magnitude of the war and the persistence with which it was carried out on both sides. In the last year of the campaign, in May 1865, after six days continuous severe fighting in the "Wilderness," entailing a loss of some 10,000 men daily, General Grant telegraphs to the President at Washington "Now ended sixth day hard fighting. I propose to fight it out on this line if it takes all summer." Surely a General capable of such a resolution, and an army able to carry it out must have something to teach us! The handling of cavalry too during this campaign was unique and very instructive. Nothing on the scale of the cavalry raids of Forest and Stewart have been attempted either before or since, not even by the famous German Ulans. The arming of the cavalry was peculiar. Many regiments charged with the revolver in preference to the sabre, and it is said with better effect. The feats of engineering performed by the pioneer battalions too were mavellous. Railways were destroyed and made with wonderful rapidity—not relaid, the work of destruction was too well understood to allow of a line once destroyed being relaid, for every rail when removed was heated red hot and twisted. As an instance of what these pioneer battalions could accomplish I may mention that they are reported to have constructed a bridge 740 feet long and 90 feet high in four and a half days.

5th.—But the last, and for a soldier the best reason that I can set forth for you to learn the War Game is, that we are ordered to use it. I propose that a game shall be played here twice a month between regiments, each regiment detailed to play nominating its own representative or champion.

And now having said so much in favor of the game it is only right to make some mention of its defects.

The first defect, and one that will probably have occurred to you already, is one common to it and to field manœuvres, viz.,—the impossibility of considering the *morale* of two contending parties. Napoleon estimated morale as equivalent to $\frac{9}{10}$ of the fighting power of troops, and Wellington used to say that he considered Napoleon's mere presence on a battle field as equal to an increase of 10,000 men. Of course with red and blue blocks we can take no note of these factors.

A second defect, and a practically more serious one, is the difficulty as to Umpires. The umpire is the referee on all points of the game, and the useful and instructive results obtainable from a game are almost in direct proportion to the ability of the Umpire. It is needless to say that officers possessing such complete professional knowledge as to enable them to discharge perfectly the duties of an Umpire, are not readily found. It is said that the most perfect form of civil government would be an autocracy with an angel as autocrat. Similarly if we could find a military angel as Umpire we should have a perfect War Game, but angels not being commonly available in this sublunary sphere we must be content with a human susbtitute. It is at any rate excellent practice for the Umpire, and there is perhaps another advantage in a player not believing in the infallibility of an Umpire, viz.,—that, however adverse may be the decision of the latter, the player may retain the proud satisfaction of a Briton, in never knowing when he is beaten.

The description of the game itself is briefly as follows:—The apparatus for playing consists of three sets of maps, on a large scale (ours are 6 inches to a mile) very boldly contoured, the contours being 50 feet apart. Here too we have to thank the Germans for a clever invention. They have contrived what may be called universal maps, consisting of four or more sheets showing an imaginary piece of country, with a due proportion of tactical features both natural and artificial as hills, rivers, woods, swamps, forts, railways &c., but so arranged that in whatever way each sheet may be turned and fitted to the others, all the contours and other features correspond, thus from the four sheets an almost infinite variety of features can be produced; to find the exact amount of variation possible one must have recourse to arithmetical progression. I see that maps on a similar principle are in use with the London Volunteer Corps, and are sold at a wonderfully low price. I think about two guineas for complete sets of maps and apparatus.

Troops are represented by small metal blocks, painted red and blue to distinguish the two sides, and made on a scale proportional to that of the map, so that a battalion or battery in line occupies the same relative space on the map that it would actually do on the ground,

A general and special ideas for either side are drawn up very much as for field manœuvres, and the commanders submit their orders for the disposition and movements of their troops to the Umpire some time before the day appointed for the game. Each commander is commonly permitted to select an officers as Chief of his Staff, with whom he may if he wishes consult, or as cavalry or artillery commander.

An Umpire and two Assistant Umpires are required, the duties of the former being as has been said to decide all questions connected with the game, as to what troops would be visible from time to time on either side, the losses from collision or fire, to regulate the number of moves, and finally to give his opinion on the strategical and tactical conduct of each game. The Assistant Umpires might better be called Assistants to the Umpire. They give no decisions but may assist the Umpire with their opinion, representing the players views without partizanship. They move the pieces on the players maps under their directions, and transfer the moves from these maps to that of the Umpire.

A further detailed description of the working of the game is not I think necessary as comprehensive rules and directions for play accompany each set of apparatus.

PIONEERS,

With some suggestions for their training, localization, and organization,

By Captain A. E. Jones, *23rd Pioneers.*

In the Native Army of India, there are certain Regiments, of which, so far as name and equipment go, no counterpart exists in the British Army. These are the so-called Pioneer Regiments, consisting at present, of three Regiments in Bengal and two in Madras. As I know little or nothing about the men composing the Regiments of Madras Pioneers, or the conditions under which they serve, the following suggestions are intended to refer entirely, to the Pioneer Regiments in Bengal, viz.—the 23rd, 32nd and 34th Pioneers.

Now what is a Pioneer. In Germany, he is a highly trained individual, holding much the same position in the German Army, as the Royal Engineer does in our own army. In India on the other hand, he is nothing more than an ordinany Infantry soldier, having a certain special equipment, in the form of a pick or pharwar (native spade), which gives him same ten (10) lbs. extra weight to carry, and in consequence of which, his fighting efficiency as an Infantry man, on service is decreased,—without being counterbalanced in any way by his efficiency as a Pioneer, the amount of ammunition he carries, being only forty rounds of snider ammunition. Of course, it may be urged, that, as he is a Pioneer he does not, or rather, is not intended to, take part in the fight as an Infantry soldier, but as a matter of fact, at present, he is entirely and solely, trained as an Infantry man, and not as a Pioneer, unless the fact, of his having a small amount of practice in the use of his tools, and sufficient physical strength to wield them, may be considered as training; moreover, on service, up to the present time, the Pioneer Regiments have been considered as nothing but Infantry, being brigaded with other Infantry Regiments, and in addition to being worried by patching up roads, digging wells &c , have had to take their share, of rear-guards, convoys, out-posts, and in fact have had to do double the work, of the ordinary Infantry soldier. As an example of this, in the late campaign in Afghanistan, the 23rd Pioneers were generally attached to one or other of the Brigades of the Kabul Field Force, for discipline and orders, and at the same time placed under the orders of the C. R. E. ; so that from the Brigade Major, they received orders to furnish their share of the various duties, such as out-posts, escorts orderlies &c., and from the C. R. E. orders for working parties for the road-making, etc.—*i. e.* they had in reality double work to perform. Of course in the latter case the men received working pay in return for their extra labour, but as this was only at the rate of two (2) annas a day, afterwards raised to three (3) annas, it did not cover the cost of the clothing they wore out.

From the above remarks, I do not wish it to be imagined, that a Pioneer does not desire to perform all the duties demanded of an Infantry soldier. On the contrary every Pioneer should be, and is, proud of his work as an Infantry man, and anxious to carry it out in its entirety, as far as may be in his power, but what I do advocate, is that, he should be well trained as an Infantry soldier, and equally as well trained as a Pioneer, instead of, as at present, thoroughly trained as the former, but quite ignorant of his work as the latter, beyond the fact of digging out occasionally a road, or constructing the earth-work, and laying down the rails of a railway which has been planned and laid out by an Engineer, and moreover when on active service, let him be regarded as one thing or the other; if as an Infantry man, let him form part of a Brigade, and perform his share of the work as an Infantry soldier; if as a Pioneer, place him solely under the orders of the C.R.E. and let him be available for every work which he is capable of doing.

In the warfare of the present day entrenchments, not those planned and laid out and constructed beforehand, but those done during the heat and turmoil of the battle, have played an important part in the past and will play a still more important part in the future. In 1870-71 we find frequent instances of the use by the Germans of what may be described as entrenchments on the offensive,—*i. e.* whenever a strong position of any sort was captured, Pioneers, if available, were at once pushed forward and the village or hamlet or house arranged for defence.

Now this is the kind of work for which Pioneers, as distinguished from Sappers and Miners in our Indian army, should be specially trained. How much more convenient it would have been in these instances, if the German Pioneers could have been pushed into the village, etc., with their tools but without their heavy waggons trundling behind them. In the same way our Pioneers in India with their tools on their backs, would be undoubtedly handier than the Sappers, with their long strings of mules straggling after them, which I fancy like the ammunition mules generally are on service, would be anywhere but in the proper place when wanted. I am far from wishing to decry the Sappers and Miners, in fact I do not think, looking at the tendency of modern warface, to become every day more and more a war of mobs, that we have anything like enough of them, but their equipment in India is undoubtedly rather cumbersome.

No, the Sapper companies should be composed, as they are at present, of highly-trained officers and men. The Pioneers on the other hand, should be, as they are at present, well-trained as Infantry, and in addition, what they are not at present, both officers and men should be thoroughly instructed, in every thing they might be called upon to do in time of war.

I will take a few examples of the way this training should be limited.

Railways. Pioneers should know how to construct the earth-work and lay down the line. Sappers in addition to this should be capable of building any bridges, wood brick or stone, that would be required, this being work requiring skilled labour and far beyond the capacity of Pioneers.

TELEGRAPHS. Pioneers should be trained and well-versed, both in construction, and destruction, of all description of telegraphs, both cable and air-line. Sappers in addition should know all about the working of the line, the construction and repair of telegraph instruments, batteries, etc.

BRIDGES. Pioneers should be able to construct, rapidly and well, what for want of a better term, we may designate as temporary field bridges, such as trestle and frame bridges, repairs to bridges which have been damaged or destroyed, and small floating bridges, the Sappers besides this being capable of constructing pile bridges, pontoon bridges etc., in fact all bridges which require higher training and more skilled labour.

In addition to what has been mentioned above, Pioneers should be thoroughly trained in the work of field entrenchments, such as obstacles, the formation and placing of abattis, the construction of wire entanglements, and of every other kind of obstacle; also of gunpits, and epaulements; of seige batteries; of field works, and entrenchments of every sort and description. In fact the object to be aimed at, should be to make the Pioneer, both officer and man, a sort of connecting link beween the Sapper and Miner, and the Infantryman, organised in Regiments like the latter, and drilled like them, but with a good portion of the training of the former, in regard to every thing requisite in the field, omitting every work in which very skilled labour is required, as quite beyond his scope.

Now what have we at present here in Bengal. Three regiments, which in the official Army List are included among the other regiments of Native Infantry, of which the Bengal Army consists, and which have the word "Pioneers," tacked on to their numbers in brackets as if it was something of which they are half ashamed, instead of being, as they are, extremely proud of the distinction. In fact the powers that be, are themselves apparently undecided how to designate these Regiments, as in some orders they are called Pioneers, and in other Bengal Native Infantry. Let us define what we mean by the word "Pioneer" broadly speaking. We mean troops who by their skill, and training, should be capable of overcoming, and clearing away, difficulties in the path of the troops following them, and of creating difficulties in the path of an enemy, and who should be both able and willing to carry out the proud motto which the 32nd Pioneers bear on their appointment viz—'Aut viam inveniam aut faciam.'

In the Muzbee Sikhs, which chiefly compose the three regiments of Punjab Pioneers, we have the physical strength, and the energy, that are requisite for the above object; but the training by means of which their energies could be utilised, and turned to the best account, is entirely wanting.

Let us glance at the present organisation of the Pioneer Regiments, and also at a few of the principal changes necesssary, to bring about the much to be desired object, of increasing their efficiency as Pioneers without prejudice to their training as Infantry, and with little, if any increased expense to the state.

And first, as regards the British Officers. At present a young officer is appointed to a Pioneer Regiment, as a probationer for the Indian Staff Corps, in the same manner as he is to any other Native Infantry Regiment, no thought apparently, being given to the fact, whether be has any peculiar qualifications, which point him out as being specially suitable, for an appointment to a Pioneer Corps or not; nor as far as I am aware, are any questions asked afterwards, as to whether he has shewn any special aptitude for a Pioneers work, or whether he likes, or dislikes a Pioneers life. The latter, has considerably more to do with a man's efficiency than is generally considered to be the case. If a man dislikes the work on which he may be employed, however conscientious he may be in the discharge of his duty, he cannot take that interest in it, which he should, and in most cases would do. The change I would suggest here would be, that the Officer Commanding a Pioneer Regiment, as being the person most directly interested in the efficiency and wellbeing of his corps, should be the man in whose hands it would rest whether the probationer, in question, should continue in a Pioneer Regiment or not, *i. e.*—after the probationer has served a sufficient time with his regiment, (say one year). To enable him to form a pretty accurate estimate of his capacity, and qualifications, the Commanding officer should submit a special report, stating whether the young officer, has shown an aptitude for, and a liking towards a Pioneer life, and a Pioneers work. Many a man may be a good officer and fond of his work as an Infantry soldier, who nevertheless dislikes, and is unfitted for, the work of a Pioneer. Should the report be unfavourable, the officer in question should be transferred to some Native Infantry regiment, where the work would be more in his own line, and more to his liking, but on the other hand, should he be reported on satisfactorily, he should be finally appointed to one or other of the Pioneer Regiments. On the first opportunity after his final appointment, the officer should have to undergo a course of practical and theoretical instruction, with the Sappers and Miners at Roorkee and at the end of his course, should have to pass an examination in the subjects composing it. The Manual of Elementary Field Engineering, compiled at the school of military Engineering, Chatham, comprises everything as far as the subjects contained in it go, which a Pioneer officer should be required to know. but in addition to what is contained therein, he should be capable, not only of superintending the construction of any field work for which he may be detailed, but also, of designing and working out details of the work, of calculating the number of working parties required, and strength of each, of the number of hours it will take to construct, the materials required for revetments and blindages, the best way the materials at hand can be utilised, and above all other things in importance, the best adaptation of the work to the ground; he should be thoroughly well grounded, in the construction and destruction of railways, and telegraphs, in the principles of road making, and in the use of a level and a theodolite, so far as may be required, in the more ordinary work of road-making or railway construction. It may be urged that men would not be found willing to go through such a course, or bother themselves with so much extra labour, without some prospective remuneration in the shape of extra pay or promotion, but I do not hold with this in the least. Men will always be found willing to do extra work, without extra pay, if they see a prospect of receiving a reward for it, in the form which every soldier desires most, viz.—the prospect of being sent on service more frequently. And this should be the case above all others, with Pioneer Regiments, for active service is useful to both officers and men; to the former, in the experience they obtain of pioneer work, in the practice of devising expedients for overcoming obstacles, and in making the best of the materials they find at hand; to the latter, it is useful, in that it keeps their thews and sinews in good order, shows them the nature of their work on service, and makes them more efficient in every way both as Pioneers, and as soldiers, but this by the way.

The expense to the state of the above suggested arrangement for the instruction of a young officer of Pioneers, would be practically nil beyond his railway fare from the station he may be quartered at, to Roorkee, and back, as, while absent from his Regiment undergoing his course, he would receive the ordinary Staff Corps pay of his rank, and his staff salary of Rs. 100 a month as a Wing Officer but would receive no extra allowance in the shape of working pay, etc. On the score of expense therefore, no objection could well be raised, and the advantages accruing to the officer himself, and the increase in his usefulness and efficiency, would be undoubted. At Roorkee, I doubt not, there are plenty of instructors available, who would be both able and willing to give the required instruction.

And now as regards the actual organisation of a Pioneer Regiment. At present this is nearly the same as a Native Infantry Regiment, (the equipment only being different) viz.—8 British officers, one medical officer and eight (8) companies of natives, the total strength of the latter being 912 of all ranks. Each company including in its total, 1 blacksmith, 1 carpenter, and 1 assistant carpenter. The men in the ranks, are, chiefly Muzbee Sikhs, with a sprinkling of Jat Sikhs, Randassies and Labhanas. The latter two castes generally receive the pahul, or Sikh baptism and differ but little from the Muzbees. There are also a few Mohammedans, and Hindoos, enlisted chiefly as blacksmiths (Mohammedans), carpenters (Hindoos), and bandsmen (Mohammedans and Hindoos), the Muzbee as a general rule not being a skilled mechanic in any line.

Muzbee Sikhs are found pretty well all over the Punjab, from Peshawar to Loodhianah, but there are but few real Muzbees south of the latter place, and the large majority of them, are found in the Lahore and Amritsar districts, in fact, I should say nearly seventy per cent. of the Muzbees in the Pioneer Regiments, come from these two districts. As a rule they marry, as soon as they can find means to support a wife, and thus a Pioneer Regiment, has generally a much larger number of women and children in their lines than any other regiment, and many more would generally be brought in, if accommodation was available, for as a rule, they are extremely poor and being at the same time of low caste, as a natural consequence they are bullied by their fellow villagers, and worried by the lumbardars. It is evident therefore, that whenever a Pioneer Regiment is moved from one station to another, the men are put to great and unavoidable expense, in moving their families, and their few goods and chattels with them. Partly for this reason, and partly because, when a Regiment is sent away from its station for work, it is advisable to have some place, where the depot can remain and where the spare baggage and stores can be put away in safety the Military authorities have of late years, partly localised the Pioneer Regiments; *i. e.*, certain stations, *viz.*, Amballa, Mean Meer, and now I presume Jhelum, have been told off as stations for Pioneers, the Regiments relieving each other about every five years or so.

Now what I would suggest would be, to develop this system of localization still more, and instead of having three stations for these Regiments I would concentrate the three Regiments in one station, removing their numbers from the Army List, and forming them into one Regiment of Pioneers, of three batallions, the station selected, being somewhere close to their best recruiting ground, say Amritsar itself. Here, ground is already available, for lines, parade ground, work ground, and rifle range. The expense therefore, would be practically confined to the cost of the new lines necessary for the three regiments, but as the regiments themselves, could furnish all the labour required, the expense would not be very great and Government would partly recoup itself by the money saved in moving the regiments from one station to another as at present.

The advantages of localizing these regiments at Amritsar are manifold, and of these a few of the most important seem to me to be.

1. Popularising the service;—The men being stationed in the midst of their own people, recruits to any required extent, and of excellent physique could be obtained; the men would not be put to the expense they are at present whenever a regiment moves, and whenever a battalion was sent away for work, or on active service, they could leave their families and belongings behind them in safety, being sure to return to the same station, which is not the case at present, in spite of the partial localization which has taken place.

(2.) Facilitating their training as Pioneers and as Infantry. A permanent work ground could be formed, where models of various sorts of earthworks could be constructed, where instruction in bridging, could be carried out, and where in short the young soldier could be given some insight into Pioneer work, made accustomed to the use of his pick or pharwar as the case may be, instead of as at present, when this instruction is almost entirely neglected, owing to the difficulties in the way of carrying it out, and the whole time of the recruit, devoted to his training as an Infantry soldier. Of course to carry out this training, that absurd regulation, which limits the period of a recruits instruction to eight months only, would have to be abolished. This time is quite long enough, to train the recruit as an Infantry soldier, provided he had not to do musketry within that period. But under present conditions, the time is altogether too short, and if the recruit is well trained in one part of his duties another part must be neglected.

While on this subject, I consider that this is certainly, one of the most urgent changes we require in the Native Army at large, viz.—that the musketry training of the recruit, should be taken out of the hands of the Adjutant altogether, and placed in that of the Wing Commander; the former officer is already overburdened with work, and the latter officer is, or ought to be, entirely responsible for the shooting and efficiency of his Wing, and therefore, it is only proper that the young soldier should be instructed by him.

(3.) Increasing the efficiency of the battalions for active service. The three battalions of Pioneers being localised together in one station, the training of the recruits, as Pioneers at any rate, would be carried out together, they would thus become acquainted with each other, and with the officers of the battalions other than their own. The present establishment of native ranks, of a Native Infantry Regiment is 912 of all ranks, but if from this we deduct old soldiers, unfit for active service, untrained recruits, sick, and men absolutely required at the depot for various duties, a battalion would rarely proceed on service, with more than 800 natives all told, but out of the three battalions of Pioneers, not more than two would be required, except on some great emergency, and these two, could be easily filled up, to their full complement of 912 from the battalion remaining behind. The men thus transferred, would not find themselves in strange company, they would probably already know most of their new comrades, and what is much more to the point, would already know the British officers under whom they would have to serve, a most important thing in my opinion, and one which has a greater effect on the efficiency of the native soldier, than is generally considered to be the case. The question may be asked But what about the active reserve for filling up the ranks? What the state of the case may be in the 32nd and 34th Pioneers, I do not know, but in the 23rd Pioneers at the present moment, excluding some fifty men in the Burmah Military Police, who have lately been brought on the strength of the active reserve; it is practically non-existent, consisting of one man only and I doubt if in Muzbee regiments, the reserve will ever reach anything like the numbers authorised or even one half those numbers,

But I have written enough to show some of the principal advantages of the localization I propose as regards the organization of the Pioneer Regiment. The three Battalions, should be kept entirely distinct, as they are now, in everything that regards the men, except in case of war, when men as before stated, would be liable to be transferred from one battalion to another. As regards the British Officers, the promotion should go in the Regiment, the senior officer of the three battalions, obtaining the vacant step if efficient, but if not being passed over, the principle of selection being rigidly applied. The command of the Pioneer Brigade, if we may so call it, and of the station at Amritsar, would be vested in the Senior Commanding Officer of one of the Pioneer battalions, aided by a Station Staff Officer. This would not be any extra expense to the State, as Amritsar is already a small station Command, and a Station Staff Officer is already in existence, who receives a staff salary of some Rs. 50 a month I believe.

And now, as to the training,—I have already stated the limits beyond which I think a Pioneers' training should not extend, but I by no means intended it to be understood, that every young recruit should be trained to such an extent. Time would not admit of this in the first place, and in the second place I think it would be quite unnecessary. The young soldier before being dismissed to take his place in the ranks, should go through a course of instruction in field works only, comprising such things, as the construction of a small redan, or lunette, or siege battery ; the formation and placing of abattis, wire entanglements, loopholding walls, making gunpits, and epaulements, constructing trestle, and frame bridges, making gabions, fascines, and other works of this sort, in fact, such work as would generally be required in the field. It would not be possible, to have the large majority of the men trained beyond this point, but then again the soldier training as a Pioneer, should not cease, when he has once joined the ranks, but every man in the regiment, should be put through the same course as a recruit at least once a year. To facilitate this object, and to aid the British Officers in instructing their men, I would suggest, that a certain number of men, say 1 Native Officer, 2 Havildars, 2 Naicks, and 2 Sepoys, per Company, out of each battalion, or a total of 3 Native Officers, 6 Havildars, 6 Naicks, and 48 Sepoys, for the 3 battalions of the Pioneer Regiment, should be despatched annually to Roorkee, and put through a course, exactly the same as that which I have before described as for the British Officer, excluding the use of the level, and of the theodolite. A certain number of these men, would then be able to act as Instructors, under the superintendence of the British Officers, and while so doing, should receive working pay, which at the rate of 3 annas a day would not be a very great expense for Government.

In the foregoing pages, I have endeavoured to sketch, in the barest outline, the training and other means, by which the efficiency of the Pioneer Regiments might be vastly increased, without any extra expense, or at least anything worth the name, to the State. We have splendid material available, and Government begrudge nothing in the shape of equipment, and yet at the present moment, the so called Pioneer Regiments, are no better trained, and on active service are of no greater use, than any Infantry Regiment, to which picks and shovels are supplied.

The value of hasty entrenchments either on the offensive, or defensive, seems to me, to be not yet fully realised in our service, and the terrible effect of fire in modern warfare, with the improvements effected of late years, both in guns, and small-arms, seem to be quite lost sight of. Even in 1870, when the weapons used on either side, were not nearly as far ranging, as penetrating, or as straight shooting, as they are now, we find the Germans making use of entrenchments not only on the defensive, but on the offensive, *i. e.*—whenever a village, or hamlet, or other strong post, was captured it was immediately organised for defence, to act as a supporting point, from whence a further attack could be prosecuted, or to cover the troops retiring in case of a reverse, and check the pursuers. During the Russo-Turkish war, we read of the Russian soldiery, turning up the sods with their bayonets, and scooping up the earth with their mess-tins, in the endeavour to obtain some slight cover, from the terrible hail of bullets, and after the capture of the Green Hills the men of Skobelof's Division, were so impressed with the fearful effects of the Turkish fire, and with the necessity of obtaining cover of some sort, that they carried the heavy picks and shovels which they had captured from the Turks, the whole way to Constantinople. An officer who was present at the Austrian field manœuvres, in the autumn of 1886, told me, that he was quite astonished at the way, in which the Austrian Infantry, who it appears all carry a small entrenching tool, obtained cover for themseles. On one occasion, he was witness of an attack by an Infantry Division on a village. The order to entranch was given, and in ten minutes hardly a man of the fighting line was to be seen.

We have already copied our continental neighbours, as far as regards practising night attacks. Why not copy them still further, and endeavour to teach our men, the use and value of field entrenchments? At the usual rate at which events move in the British Service, it will be many years yet, before our Infantry are equipped with a small entrenching tool of any sort, and this deficiency, is especially felt in India. Here we have splendid troops, both British, and Native, and numbers sufficient for a Great War, if it should come. But look at their armament, and equipment. Our Artillery, are armed with the 9 pounder R. M. L. which Lord Wolseley has described as the worst gun in Europe. Our Native troops, which constitute 2-3rds of our force, have Snider rifles only, for the most part worn out, and even at their best, inferior to the weapon of any other troops in Europe. Even the troops of bankrupt Turkey are better armed, than ours. Until our troops are re-armed, there is very little chance indeed, of their being equipped with entrenching tools by an economical Government, but in the meantime, why not make the best use of the materials we have at hand—3 regiments, fully equipped, with plenty of will, energy and strength, but where the training and skill are sadly wanting.

MILITARY SELF-DEFENCE.

By Major E. Lloyd, *Garrison Instructor.*

Knowing that the above subject has been already ably dealt with in this journal some few years ago by Major (now Colonel) King-Harman, an officer who has had far more practical experience in such matters than I can pretend to, I give the following suggestions with a certain amount of diffidence. As, however, the matter is a hobby of mine, and as in these days of necessarily high class military education, the subject of self-defence, the very A B C, as it were, of a fighting profession, appears to be in danger of not receiving all the attention it deserves, I give forth my ideas for what they may be worth.

I have not the advantage of having by me for reference the number of the United Service Journal containing Colonel King-Harman's lecture, so that some of the following remarks may be but a repetition of what has been already said by that officer; if so the plagiarism is unintentional.

Military self-defence, as far as an officer is concerned, consists, I take it, of two branches, pistol-shooting and swordsmanship. The former is undoubtedly the most important of the two, but it is receiving now an increasing amount of attention, and it is therefore to the latter that I propose to devote the bulk of the following brief notes.

Of revolvers and revolver shooting I would, however, make *en passant* the following remarks, although the subject has been already exhaustively dealt with by Major Kitchener in No. CXXXVII. of the Journal of the Royal United Service Institution. First as regards the weapon :—I cannot understand,—and I am by no means alone in this,—what the necessity is, or the advantage either, of making the revolver a rifle. The ranges at which it is generally used on service are from 5 to 20 yards, more rarely from 20 to 30. For these distances a spherical bullet is as good as, or even better than, an elongated one, its initial velocity with a given charge of powder being greater than that of a conical bullet of the same calibre, while its penetration is less, both of which are desirable qualities in a pistol bullet.

It may seem paradoxical to speak of 'small penetration' as being a desirable quality. My meaning is this :—What is wanted chiefly in a pistol bullet is great stopping, or knocking down, power; now if a bullet has so great penetration that it goes *through* a man, all the force that is exerted after it has passed through him is so much force wasted. With an equal momentum but with less penetration (provided of course the penetration be sufficient to cause the bullet to enter the object struck) the whole of its power is expended on its legitimate duty, so to speak, of knocking down its man.

Constant complaints have been made by officers who have had practical opportunities of judging of the stopping-powers of the revolver, that the regulation bore and regulation powder charge are too small to arrest the rush of a fanatical savage. Now the latest type (mark III.) of regulation revolver carries a bullet of 0·476 bore, but the bore of the barrel is 0·450, consequently the bullet is of that calibre when it leaves the muzzle, which is the same as that of regulation revolver mark II.; the weight of the bullet and the powder-charge are also the same, viz.,—265 and 18 grs. respectively, which most men, I believe, agree in thinking too small to stop a desperate man. I had for some years in my possession a five chambered *rifled* revolver, which carried, however, a *round* bullet of 0·577 bore (the same size as the Snider). I have carried it on horseback for hundreds of miles, without feeling greater inconvenience than would be occasioned by carrying any full sized revolver. It was the most efficient pistol I have ever seen, though what the advantage of its being rifled was I never could discover. The ideal revolver to my thinking would be a smooth bore of about 0·577 calibre with five, or four, chambers, (the latter number for choice,) carrying a powder-charge of 40 grains,—the same as the Colt revolver, the recoil of which is by no means excessive,—and a bullet weighing whatever a spherical bullet of that calibre would weigh, say about 200 grains. It is a pity I think that gun-makers do not make such a weapon.

As regards pistol shooting, that is a science which belongs to the Musketry Department, and all that I would observe concerning it is, that for a mounted man skill in shooting with his *right* hand is most essential, while a dismounted man would usually use his *left* hand; in either case practice in continuous firing (that is cocking the pistol by pressure on the trigger only) is far more necessary than practice in shooting with deliberate aim after cocking the pistol with the thumb. The following is a 'tip' worth, perhaps, bearing in mind,—the two last chambers that it is intended to use are very advantageously loaded with buck-shot cartridges.

To turn, however, to swordsmanship; the 'dummy' weapons now used to teach the science are the foil and the single-stick. Neither of these, I maintain, adequately represents the sword. The single-stick weighs only a few ounces, and it is manifest that the whole method of using it must be entirely different from that of using a sword which weighs something like five or six times as much. Any one who has tried the two will, I think, admit the truth of this. The most 'counting' hits with the single-stick are quick 'taps' at the wrist or leg, a cut with the side being as efficient as one with the part representing its edge. With a sword these quick 'taps' are not only ineffective, but, on account of its weight, impracticable. Most men, too, are agreed that the point is the best mode of attack, for an European at least, to adopt, because, among other reasons, it is quicker, and, consequently, harder to parry. With the sword, or with the 'sword stick' which I propose to be introduced and which is described below, this is true, but with the ordinary single-stick exactly the reverse is the case, and it is the *cut*, not the point, that is the quickest, because the extreme lightness of the single stick enables the wielder, by wrist play, to move it much more rapidly, using it as a switch, than he could do if he tried to stab or prod with it. So that the tendency of single-stick practice is to habituate men to use the cut in preference to the point. To quote the words of no less an authority than Colonel Onslow, Superintendent of Gymnasia in England:—"A man may be very good with a single-stick, but a duffer with a sword;" in the truth of which verdict I, for one, most entirely believe. If this be the case, and if single-stick, as at present practised, does not teach swordsmanship, it is difficult to see its *raison d'être* at all; the inference is that it either should be abolished or "reformed."

Nor does an ordinary fencing foil, by reason of its extreme lightness and flexibility, represent the regulation sword any better than a single-stick does. Fencing, unlike single-stick, teaches the use of the point alone, which is after all but half of swordsmanship, the use of the edge should be at least equally practised. I admit that fencing and single-stick both *indirectly* tend to produce swordsmen, to about the same extent as most games of skill, (such, for instance, as rackets, cricket, or even lawn-tennis,) would do, inasmuch as they increase quickness and improve the working together of hand and eye. I think, however, that a weapon and a system might be introduced which would give far more useful practice in the efficient handling of the regulation sword or sabre than either single stick or foil is capable of doing.

The 'dummy' weapon that I propose is a stoutish stick covered with leather, (after the fashion of the 'ghatkas' in use in some Native Cavalry Regiments:) this 'sword-stick,' or whatever it may be called, to be made of different sizes, each size being exactly similar in weight, length, and balance, to the corresponding size of regulation sword. There would be no practical difficulty in securing this. The 'grip' and 'guard' of the hilt to be also according to regulation shape.

Such an implement as nearly represents the real thing as it is possible for any 'dummy' weapon to do, far more nearly than boxing gloves represent fists. A man practising with it soon learns the relative advantages, and the reverse, of cut and point, which he certainly does not with the weapons now in use. His hand and arm, too, get accustomed to wielding a weapon of the same weight and balance as his own sword; this is a very important point for it is astonishing how quickly and how utterly wearied the unaccustomed hand and arm become from using energetically and vigorously, in the way that a man does in loose play, or in real work, a weapon as heavy even as a regulation sword. No amount of single-stick or fencing will accustom the muscles of a man's arm and hand to use a sword as he would have to use it were he fighting for dear life.

It may be objected that a comparatively weighty instrument, such as I have described, would hurt too much to be used in friendly practice. It undoubtedly does hurt; but then so does a single-stick when laid on with a will! "You cannot make omelettes without breaking eggs," a well-worn saying by the way, and one which most men with a fad, which may prove dangerous, manage to drag into their service. I know practically, however, that *my* fad is workable, at any rate on a small scale, and, moreover, this hurting evil can be reduced to a minimum by the use of the ordinary wood and wire helmets, padded jackets gauntlets, and so forth. It will be found, too, that *cuts* which get home, would be far less frequent under the system I advocate than they are in ordinary single-stick practice, because the cutting motion of the sword or sword-stick is much slower than it is in the case of the single-stick. *Thrusts* would reach home as often, probably, as they do now, but they would not hurt more than a single-stick thrust hurts.

Now as regards scoring :—Nothing, I think, can be more wrong in principle than is the scoring of all hits equally. One of the most telling of single-stick hits is a 'tap' on your antagonist's advanced leg, (as often as not with what would be the side of the weapon) in real business a very effective return for such an attack would be to let your adversary have his tap, and, seizing the opportunity, bring down a strong cut on his exposed head. In single-stick, as now practised, (or as it was, at least, some four or five years ago,) the two hits would score equally, or perhaps in case of their being delivered simultaneously neither would count at all. This hardly represents the state of affairs had the contest been a real one, and with swords; the one combatant would probably not have been even temporarily disabled, the other would almost certainly have been placed *hors de combat*.

To obviate this kind of anomaly I would suggest the following principles of scoring. I give details, but I do so merely in order to explain principles. Of course the exact points allowed, and other *minutiæ*, could be better settled in the light of actual experiment. Most of the rules at present in force would still obtain, I only suggest a few additional rules which the introduction of the system I propose would necessitate.

All hits to be divided into 'effective' and 'non-effective,' *only* 'effective' hits to count. By 'non-effective' hits I mean mere taps, and hits with any portion of the weapon other than the edge or point. Of course an umpire, referee, or committee would have to decide whether a hit were delivered with sufficient force or not to be considered 'effective'; whether it were delivered with the edge or point the following precaution would ensure.

Before being used every stick to be distinctly chalk-marked with a line representing the edge; the point also to be chalked. No hit to count unless a chalk mark be left by the weapon.

Any effective cut on the head, face, right arm, or right wrist, to count, say 4 points.

Any effective cut on any other part of the body to count, say 2 points.

Any effective point to count, say 50 per cent. more than a cut on the same part of the body would do.

The *first* effective cut or point to count twice as much as any subsequent cut or point on the same part of the body would do. The same system of scoring to apply to mounted combats.

I am well aware that additional rules would probably become necessary, and perhaps some of those I have suggested might have to be modified, but this could only be found out by actual experience. All that I would urge is that the system is worth a trial, which would cost but very little. English officers are, as all the world knows, the best riders, the best sportsmen, and the best athletes all round of any officers in existence. I don't think it would be very far from the truth to add, and the worst swordsmen and pistol shots, though there are many more brilliant exceptions in this last named accomplishment than there are in its sister one. There are no doubt many matters which come far before 'self-defence' in the catalogue of desirable military acquirements, *per contra* an officer has to master some subjects which I venture to think rank after it in importance. It goes without saying that men cannot be called upon to spend more time than they do now in going through courses, even as it is that time is perhaps longer than is altogether desirable, but if by eleminating some of the less urgently needful subjects, or rather portions of subjects, time could be found for instruction in self-defence, I cannot but think that it would be a consummation devoutly to be wished.

THE TACTICS OF ARTILLERY.

Being a summary with notes of the "Letters on Artillery of Prince Kraft zu Hohenlohe Ingelfingen," prepared by MAJOR E. R. ELLES, *R. A.*

The very small amount of attention bestowed in our service on the "Tactics of Field Artillery" must have struck most painfully everyone who has given the subject a thought. All Artillery Officers will have read with absorbing interest the "Letters on Artillery by Prince Kraft zu Hohenlohe Ingelfingen" which have appeared in the R. A. I. Journal translated by Major Walford, and in reading them every gunner must have been struck with the conviction that in many Artillery questions in applied tactics we are far behind our continental neighbours. When we consider that we are inferior to none in personnel and are the best horsed Artillery in the world there must be something radically wrong in our system when we stop so very far short of perfection in general results. The fact is that we have for many years mistaken the means for the end and, to a certain extent, do so still: we have taken as our standard of excellence the perfection of "turn out" of a battery instead of its shooting powers and appear to consider tactical handling of masses of Artillery and fire discipline in the battle as somewhat unnecessary under our conditions of service; the result being that an Artillery Officer's career may be said to be practically over with his promotion to Lieutenant-Colonel. It is not by any means intended to disparage "smartness," for smartness means discipline and good interior economy, but any idea of regarding mere smartness as the end to be attained is much to be deprecated. Our standard of excellence should be an all round standard, and shooting especially should be given greater weight to; as Prince Kraft says—"The object of Artillery is in the first place *to hit*, in the second place *to hit* and in the third place *to hit*." This means that the whole aim and object of a battery commander is to make his battery shoot effectively and as he cannot "hit" unless he is on the spot at the right time, in order to thoroughly carry out Prince Krafts maxim we must have a perfect battery in every way. We may therefore say that in any great war our failings would be —

(I.)—Inferiority of our field guns.
(II.)—*Want of tactical training in our senior officers above the rank of Major.
(III.)—*Want of any system of applying the fire of Artillery masses.
(IV.)—*Indifferent shooting due to (III.) and (I.) and to want of systematic training and sufficient practice in peace time.
(V.)—Failure in combined tactics and want of unanimity with the other arms.

For the first deficiency we have to thank the Government we serve and the ability of its advisers on Artillery matters who have skilfully

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*** Attention has lately been turned to all these points.**

managed to keep us about ten years behind the times in guns, fuzes &c. on which good shooting and efficiency depend. The new 12 pounder is now sanctioned and about to be issued, but for financial and other reasons, the issue is likely to be very slow. For the second and third point we have to thank ourselves, and the attention until lately paid to tactical training may be judged of by the fact that in the "Manual for Field Artillery," a voluminous work of 376 pages, the employment of Artillery in the field is dismissed in 10 pages as if it were a subject to be rather ashamed of and kept out of sight, and the supply of ammunition in the field is practically not treated of at all; and yet should not all our efforts be applied towards fitting our Field Artillery for employment in the field. When so little stress is laid on tactics in our regulations how can we expect senior officers with their few opportunities to become good tacticians.

With regard to the fourth point we have chiefly to thank ourselves, for although our guns are bad yet that is no reason why our Artillery practice should not have been carried out on a system more likely to form valuable teaching which could be afterwards applied on service.

The fifth point is one in which we especially fail and attention has just been drawn to it by Major Trotter in an article in the R. A. I. Journal for March on "Tactical Instruction for Field Artillery" where he quotes the opinion of one of the German Officers who were present at Delhi Camp of Exercise in 1885.

"The truth is that the different arms of the service in the English Army are not sufficiently closely united; there is too much caste spirit, they fail to perceive that each only exists for the other and that the efficiency of an army is measured by the product, not the sum, of the efficiency of each arm." How true this is any one us who has been present at a large camp of exercise must admit. In the Delhi camp of 1885, have we not seen Cavalry hanging on close to the flank of the Infantry, and apparently seeking protection from it instead of covering it, with the result that this flank was turned and on service a complete disaster would have resulted; have we not seen batteries of artillery trotting or galloping more or less aimlessly no system of attack for the artillery, as a whole, having been determined on; and have we not seen, and do we not constantly see, infantry led on to a frontal attack without waiting for due preparation by artillery fire without which from all recent experience frontal attack is absolutely impossible.

The object with which this article has been undertaken is to endeavour to induce officers of the other arms to take an interest in the tactics of Artillery and to understand them. The letters are very simple, but when we ourselves have paid so little attention to the subject, how can we expect officers of other arms to do so. In the German army the artillery have stood nobly by their brothers in arms on the battle field and from having been almost regarded as a useless incumbrance before 1870-71, chiefly owing to their failure in the Austrian Campaign of 1866, the German artillery is now regarded with a feeling of what we can best describe as reverence, and the other arms recognise that it is to the efficient action alone of the artillery in the first phases of the fight that the infantry or cavalry can look for ultimate success.

With the object in view of inducing infantry or cavalry officers to study Artillery Tactics the writer is induced to summarise and note on the able letters of Prince Kraft, who must be regarded as the best practical authority of the day on artillery questions and who has probably had more experience than any man living; his statements and maxims are all based on hardly won experience and there is no suspicion of theory about them. At the present time officers of the other arms are dependent for their teaching in artillery tactics on Clery, a work wholely behind the day and some of the teaching of which in artillery tactics is most misleading if not absolutely wrong. That this work should be the standard tactical work of instruction for the officers of our army must be a source of astonishment to the intelligent foreigner. Prince Krafts letters are somewhat long and enter too much into details for other than artillery officers and further probably only the latter have access to them. I can only add that they have already begun to have a marked influence on artillery questions in our service and are likely to prove of inestimable benefit in making us recognise our own defects instead of nursing the conceit that we have reached perfection.

1st LETTER.

On the use of Artillery in 1866.

In the 1st Letter Prince Kraft discusses the reason why the Prussian Artillery which in 1870, did such excellent service, failed altogether 4 years before in the war with Austria in 1866 to come up to the expectation caused by the effect which it produced at Duppel in 1864, and this though its "materiel" was with but few exceptions the same whilst it was under the command of the very same men.

The generally accepted reason given for this is that the Prussian Artillery, though nearly equal to the Austrian had only 10 batteries in each group of 16, armed with rifled guns, whereas all the Austrian batteries had rifled guns.

This answer however is neither exhaustive nor accurate, for the Austrian pieces were muzzle loading guns which on account of their complicated system of rifling, of their slow and difficult service, of the uncertain bursts of their percussion shell, and of the doubtful effect of their shrapnel were altogether inferior as regards accuracy and effect of fire to the rifled breech-loading Prussian pieces. In fact if we only consider the factor "materiel" we are inclined to admit that the Prussian Artillery should have shown itself superior to the Austrian. The true reason for the failure of the Prussian Artillery lay in the fact that in nearly all the engagements the greater part of the Prussian Artillery was never brought into action at all; it either entered on the scene too late or with for too small a number of guns.

Thus at Trantenan only 38 out of the 96 guns present with the Army corps took an active part in the engagement, *but never more than two batteries were in action at the same time.* For three hours the infantry though hard pressed were entirely without assistance from Artillery.

At Soor the next day, when the guard corps defeated the 10th Austrian Corps we find that in one part of the field, one Prussian battery (6 guns), was in action against 6 Austrian (48 guns). In another part of the field two Prussian batteries were in action against two Austrian. Thus out of the 78 guns with the guard corps on this day *only* 18 *took part* in the action, but the guard infantry notwithstanding the murderous fire of the enemy's guns won a brilliant victory.

At Nachod up to 11 A. M., 12 Prussian guns were engaging 32 Austrian; up to midday 10 Prussian against 32 Austrian, from noon to 4-30, 18 Prussian against 80 or 88 Austrian and not till after 4-30, 66 Prussian against 88 Austrian which were gradually reduced in number.

At Stralitz at noon two Prussian batteries came into action against 40 Austrian guns, shortly re-inforced by three batteries. It was not until 12-30 that the reserve Prussian Artillery came into action though they had been only two miles off since early morning. Thus whilst all the Austrian Artillery were in action from the first, the mass of the Prussian Artillery were not brought up until the infantry had been forced *to undergo superior Artillery fire for two hours.*

At Gitschin only 18 *Prussian guns were brought into action against* 122 *Austrian* and it is not surprising to read that the infantry of the 5th Division were stopped in their advance by the enemy's Artillery fire alone.

At Koniggratz Fransecky's infantry assisted by *only* 24 *guns* were covered by a hail of projectiles from 136 *Austrian guns with terrible effect.*

These instances are sufficient to show that in 1866 the Prussian Artillery did not come up to what they had a right to expect *and that it never arrived at the point of action in sufficient numbers.* On every occasion, except one, the Austrians with an equal artillery managed to bring 2, 3 or even 4 times the number of guns into action. It was also proved that

(I.)—The Prussian Artillery did not shoot so well as had been anticipated judging from the results of practice ranges.

(II.)—That the renewal of Ammunition was carried out on no regular plan *and that ammunition failed in many batteries.*

(III.)—That batteries constantly went out of action owing to infantry fire or to refit when they would have done much better to have remained in position.

These points will be dealt with hereafter.

2ND LETTER.

On the use of Artillery in 1870-71.

In the campaign of 1870-71 the Prussian Artillery at the commencement of the war found itself in a better position than the enemy's; all the Prussian guns were rifled and of recent construction, whilst the French guns were still the bronze S. B. guns, altered on the Lahitte system ; the alteration was a half measure and their fire was inferior to that of the Austrian guns in 1866. The Prussian leaders too had learnt how to bring up their artillery everywhere at the exact moment and in sufficient numbers.

At Wiessenburg the action was opened and the attack prepared by artillery and 66 guns came into action against 18 French guns. The guns fired at the closest possible range to blow in the gates of Weissenburg, when the infantry failed to break them down and underwent a deadly fire from the enemy's infantry in bombarding the chateau of Gneissburg when the infantry assault had failed.

At Worth 84 guns of the 5th Corps and 24 of the 11th Corps were in action by 9-30, the artillery was deployed from the first and every available gun brought into action, not only before the infantry had carried out its first attack but before it had changed from order of march to order of battle, the deployment being carried out under the protection of these 108 guns. The 5th Corps was the same which fought at Nachod when its tactics formed a strong contrast. Eight more batteries of the 11th Corps were brought up before the infantry of the main body of this corps were brought into action. When the infantry were prevented from advancing from the northern edge of the Niederwald by the enemy's fire, the artillery were pushed out to the front and eight batteries came into action in the very thickest of the enemy's infantry fire and supported the attack on Elsashausen; later on they also aided in repelling the enemy's counter attacks. During the pursuit the artillery still supported the other arms at all points. The manner of handling the artillery at Worth forms a strong contrast to its use at Stralitz in 1866.

The battle of Spichern was fought on the some day as that of Worth and was again an accidental encounter, but the artillery opened the action in superior numbers. Four batteries (24 guns) commenced the action and within an hour the Prussian batteries advanced within reach of infantry fire to facilitate the advance of their own infantry and drove back the enemy's artillery. Eleven batteries (66 guns) in all were employed in this battle, and not one that reached the field was kept inactive, and though the troops arrived by fractions, chiefly by rail, it was found possible to obtain the decisive action produced by a mass of artillery ; one battery arrived by rail direct from Kónigsburg in Prussia and at once took part in the fight. This action forms a great contrast to that of Trautenau in 1866.

At Colombey the whole of the artillery were pushed forward, some with escort and some without, preceeding their own troops in order to prepare the attack while the infantry followed and deployed ; 132 guns took part in the action. This battle like Worth was not contemplated before hand but was brought on by a reconnaisance.

At Mars-la-Tour the battle commenced with a reconnaissance prepared by the fire of 30 Horse Artillery guns. Between 11 and 12 o'clock a line of 126 guns crowned the heights between Trouville and the wood at Vionville. Some of these batteries before the arrival of their own infantry had to defend themselves against the masses of the enemy's infantry *without the assistance of any other arm.* The line was later re-inforced by 4 batteries, bringing it up to 150 guns which remained in action to the end of the day, when darkness alone stopped their fire: Here again the artillery were pushed on ahead of their own troops to prepare the way and support the guns already in action and every gun which could possibly reach the field, 210 in all many marching long distances, assisted in the contest and for several hours in the afternoon all fired simultaneously.

At the battle of Gravelotte we find the German Artillery acting in three great groups, the mass on the right composed of 27 batteries (162 guns); that of the centre against Amanvilliers had 13 batteries and that of the left wing on St. Privat 30 batteries (180 guns). Thus 70 batteries had commenced firing before the masses of infantry were sent forward to the decisive attack, The attack on the village of St. Marie aux Chênes was prepared by a semicircle of 88 guns and the available masses of Artillery might have been employed as powerfully and successfully against St. Privat had they been informed that the attack was intended. The infantry suddenly attacked the yet uninjured village and masked the fire of the guns but were unable to advance until the batteries hastened forward into the infantry fire and so overwhelmed the place with shells that its capture became possible.

Here again, when infantry made the decisive assault, the Artillery as at Gravelotte advanced absolutely into the line of skirmishers and supported the infantry. Compare the action here with that at Kóniggratz in 1866. At Sedan we find the following masses preparing the way for the attack.

To the south of Sedan a battery of 114 guns bombarding Sedan. Near these 36 guns of the 4th Corps.

To the east 24 batteries or 144 guns belonging to the 1st Bavarian, 4th and 12th Corps, 18 of whose batteries could find no room to come into action.

To the north 90 guns of the Guard Corps.

To the north-west 26 batteries or 156 guns of the 5th and 11th Corps.

There were thus 5 Groups numbering 540 guns firing at the same target.

The comparative manner of employing artillery in the two campaigns of 1866 and 1870-71 may be summarised at follows:—

1.—In 1866 great unwillingness to employ much artillery to prepare the action. In 1870 as much as possible was brought into action from the first.

2.—In 1866 it was assumed as a principle that a reserve of artillery should be kept even in the height of an action: In 1870 a reserve of artillery was recognised as useless and even the name disappeared being changed into "Corps Artillery."

3.—In 1866 artillery marched as near as possible to the tail of columns or even some days march in rear. In 1870 it was held as a principle that it should be as far to the front in the column of march as was compatible with its safety. Corps even sent their artillery far ahead into the battle.

4.—Finally in 1866 masses of artillery moved during their marches at a very slow pace. In 1870 great masses of artillery marched distances of many German miles at a trot, arriving at their positions with a gain of many hours.

3RD LETTER.

The fire effect of the artillery during the war of 1866.

In 1866 the Prussian artillery entered upon the campaign absolutely certain that nothing could resist their new rifled B. L. Guns which were superior to other rifled guns then in use. They expected to see the other arms, infantry as well as cavalry disperse like chaff as soon as the shell fell and burst among them.

To their surprise they found that their fire produced no such results. During the whole course of the campaign nowhere did their artillery play a decisive part with regard to the other arms of the enemy. No considerable mass of infantry, no grand corps of cavalry were destroyed by it; against no object of attack, neither village nor position did it open its fire in the preparation for attack, in such a manner as to render the success of an assault certain.

After the war of 1866 the artillery felt that they had not shot sufficiently well, though they had fought where ordered to, held strictly to the drill books and shot as they had been taught. The conviction forced itself upon them that the reasons why the anticipated effect had not been attained with the artillery were :—

(I.)—That their tactics were defective.

(II.)—That the instruction imparted in shooting was insufficient and ineffective.

With regard to the former it was pointed out in the 1st letter that they were almost always inferior in numbers at the point of action to the enemy's artillery. As an instance of the latter point Prince Kraft states that there were occasions on which masses of artillery kept throwing their shell shorter and shorter until the projectiles were falling 300 or 400 paces short of the target, this was due to the tangent scale slipping down a little at each round owing to the shock of discharge *and no one took care to set it again.* Added to this the fuzes at that time were no doubt indifferent and rifled guns with high initial velocities and bad fuzes may be said to be almost useless.

From that moment Prince Kraft says that every officer of the Prussian artillery sought, as the object of his constant meditation, to discover by what means their artillery might be placed in a position to furnish a more effective fire. The splendid successes of the Prussian artillery in 1870-71, bear witness to the thoroughness with which the question was studied and the problem solved.

4TH LETTER.

The fire effect of the artillery during the war of 1870-71.

The tactical handling of the artillery in 1870, has been commented on in the 2nd Letter, and it remains to show what were the results attained.

At the attack on St. Privat by the infantry of the guard the artillery fire was soon masked, and Prince Kraft ordered a mass of several batteries to accompany the infantry. This they did and French officers who were taken prisoners stated afterwards that the effect of the artillery fire was so murderous that if the infantry attack had taken place half an hour later, no defenders would have been found in the village. One battery advanced at a gallop, losing three guns on the way by horses shot, and came into action on the crest of a hill against masses of infantry in quarter columns at 200 to 500 paces advancing to dispute the crest. The first shot checked them and more batteries coming up the columns turned and fled. Shortly afterwards the enemy's infantry advanced against the artillery line of 30 guns from Amanvilliers. The guns opened at 1900 paces, having marked this point with trial shots and commenced fire when the enemy came up to it; they ceased fire when their shells were bursting too far and repeated the same system at 1700, 1500, 1300, 1100 and 900 paces. The columns suffered heavily and at 900 paces at last turned and fled. This attack then was purely and solely repulsed by artillery fire. A French staff officer afterwards said, "It was impossible to succeed, you have no idea what it is to have to advance under the fire of your artillery." Two more attacks were made but they did not advance so far as the first.

At Sedan the effect of the artillery fire against all arms was most marked. In a French pamphlet published shortly after the war we read "The Emperor himself tried to post three batteries at the exit from the low ground of the Givonne. *They were demolished without firing a shot.*"

The visible results attained increased the confidence of the men in their guns and in the regulation of the fire. They became more and more careful to obey words of command, to make the corrections ordered, to set the tangent scale with greater exactness and to lay the guns with greater accuracy, so that their effect became more and more irresistible.

During the action of Sedan it became clear that the capture of the Bois de Garenne would complete the entire defeat of the enemy. Large masses of infantry composed of two beaten Army Corps of the enemy were crowded into it. Prince Kraft divided the wood into sections telling off a section to each of his batteries. The first gun of each unit was to fire at the edge of the wood and each gun in succession in the same direction but with 100 paces more elevation than the gun on its right. In this manner the edge of the forest and the forest to a depth of 500 paces was covered with a hail of shell. At length the infantry of the 1st Division of the guard were advanced to the attack and the resistance met with was almost *nil.* At most points the French utterly discouraged, advanced to meet the attacking troops crying,

"Mercy! Mercy! we can do nothing; we are crushed by the fire of your artillery'"

All accounts of the war unite in bearing witness to the admirable way in which the German artillery was handled and shot throughout the campaign and the gallant manner in which they were pushed forward into the thick of the fight in support of the other arms, themselves suffering most heavily on many occasions.

5TH LETTER.

The losses of the Artillery in guns in the campaign of 1866 *and in that of* 1870.

In 1866 the time honored idea still existed that a certain amount of disgrace attached to an artillery officer who lost his guns in action; the result of this was that the following occurrences were noticeable in this campaign.

(I.)—Guns retiring to seek for ammunition when their supply was expended (ammunition constantly ran short owing to no proper system for supply.)

(II.)—Batteries falling back out of action to refit.

(III.)—Avoidance of exposing guns to infantry fire, it being the rule that when the fire of the enemy's skirmishers become effective, artillery must retire.

To the war of 1870-71, although infantry fire had become yet more deadly, we are indebted for abolishing the idea that loss of guns was in any way disgraceful, in fact the principle was established that under certain circumstances it was an honour to have sacrificed them; Prince Kraft says—" I could name you two artillery officers of high rank, who emulated each others actions in the last war. One of them said to the other " I have an advantage over you in one point. I have lost guns and you have not."

This new departure having been accepted, naturally brought about a complete revolution in artillery Tactics and we find the following leading features introduced on the offensive.

(I.)—That artillery when once in action should not be withdrawn even though they had expended all their ammunition.

(II.)—That batteries were not withdrawn from action to refit.

(III.)—That it was the rule for artillery to be pushed forward to within infantry range and hold their ground there.

(IV.)—That artillery on several occasions repulsed unaided by the other arms the infantry counter attacks of the enemy.

(V.)—That guns were never kept in reserve.

(VI.)—Guns only fell back under the orders of the general officer commanding when he judged it advisable to discontinue the action.

With regard to the first point it seems at first sight a useless sacrifice to keep artillery in position under fire without ammunition, but the argument in its favor is a strong one *viz*:—that if artillery fall back a very great effect is produced on the other arms by its retirement. When infantry or cavalry see the artillery retiring they conclude that the struggle is abandoned and that the battle is regarded as lost. The supply of ammunition in the field was carefully and regularly carried out and it rarely happened that batteries ran short of ammunition, but many batteries stood their ground when their ammunition was expended. One officer commanding whilst waiting for ammunition, mounted his men on the guns and limbers and made them sing " *Wacht am Rhein* " to pass the time pleasantly !

With regard to (II.) Prince Kraft gives the following instance of how undesirable it is to withdraw a battery to refit.

In action a battery is disabled as follows and temporarily almost useless :—

No. 1 gun—All horses killed by one shrapnel.
,, 2 ,, On the ground both wheels broken.
,, 3 ,, Disabled by a shot in the muzzle.
,, 4 ,, Limber blown up.
,, 5 ,, Tangent scale shot away.
,, 6 ,, Breech block disabled.

Should this battery be withdrawn to refit? Certainly not. In less than 10 minutes five of the guns can open fire again by taking the following action, No. 3 gun being useless may be abandoned.

No. 1 gun—Receives 4 horses from No. 3.
,, 2 ,, Receives wheels from No. 3.
,, 3 ,, Abandoned as useless.
,, 4 ,, Receives limber and wheelers from No. 3.
,, 5 ,, Receives tangent scale from No. 3.
,, 6 ,, Receives breech block from No. 3.

If another battery comes up on its flank instead of relieving it, there will be 11 guns in action instead of six only.

If guns cannot hold their ground they should be reinforced and not withdrawn.

With regard to (III and IV) in every battle guns were advanced to within effective infantry fire, the following instances being especially noticeable :—

(*a*) The advance of two batteries in the battle of Spicheren up to the lately captured Rotheberg under the very hottest infantry fire.

(*b*) The advance of guns on Weissenburg in order to blow open the gates.

(*c*) The pushing forward of guns into Bazeilles when in flames for the purpose of firing at the very shortest ranges at houses in the possession of the enemy.

(*d*) At Worth as soon as the opposite side of the valley was occupied by infantry the artillery hurried over.

(*e*) In the attack on Elsasbausen eight batteries took up position under the thick of infantry fire.

(*f*) At Colombey-Nouilly the whole artillery line held their own under effective infantry fire.

(*g*) As Vionville and Mars-la-Tour the whole mass of 210 guns was almost constantly within range of a most energetic infantry fire and repulsed many counter strokes of the enemy's infantry unaided.

(*h*) In the attack on Saint Privat the batteries of the artillery of the guard lost 25 per cent. horses and 20 per cent. men and attributed 75% of these losses to Chassepot bullets; for 4 hours they had a line of infantry in extended order at 900-1000 paces off in their front.

(*i*) In the same attack some batteries opened on masses of the enemy at 300 to 500 paces.

These numerous instances have been summarised as this feature marks a radical change in artillery Tactics. *Infantry are the backbone of the army and artillery must sacrifice themselves to save them as far as possible from loss.*

6TH LETTER.

How it was that the Artillery always came up at the right time in 1870-71.

In the days of smooth bores the necessity for prolonged mobility did not exist chiefly owing to the fact that the short ranges at which musketry fire was effective did not demand a long preparatory fire of artillery and consequently there was not the same necessity for pushing artillery long distances to the front and demanding prolonged efforts from them. The mobility required of them was of a different character and consisted in being able to advance from extreme range of perhaps 2000 paces to the must favorable range of 1000 paces at a rapid pace.

The introduction of rifled guns which could open effective fire at long range and the experience of 1866 considerably altered the demands on the mobility of artillery. It was found that instead of having to pass rapidly over a few hundred paces, distances had to be measured by miles and day's marches. In 1866, artillery were assigned a position some distance to the rear apparently from a fear of blocking the roads in front and the consequence was that it was always brought up in inferior numbers to the enemy. The results of the war of 1866 were that attention was paid as a matter of regulation to the training of batteries in undertaking rapid and forced marches; and the benefits of this instruction were very apparent in the war of 1870-71. Artillery was in this war placed much nearer the front of a marching column:—the battery of an advanced guard marched in rear of the leading battalion; the Artillery Brigade of a Division in rear of the leading regiment; the mass of the Corps-Artillery, when the corps was on one road, in rear of the leading brigade or at latest in rear of the leading Division; when practicable several parallel roads were used for an Army Corps. Even then the distances which had to be covered by Artillery in coming into action were very great:—

(*a*) At Sedan the Corps Artillery of the Guard, trotted 9 miles at a spell.

(*b*) The 1st H. A battery of the guard marched on the 13th August 32 English miles.

After 1866. the Prussian Artillery in peace time learned to keep their horses in wind and to make, quick forced marches in preference to learning elegant manœuvres.

At the inspection by the Inspector General the regiments of Artillery were directed to await him 3 or 4 miles from the practice ground and on the "Alarm" being sounded to make their way into position by a rapid forced march.

The following instances are given by General von Dresky:—

(*a*) On 6th August he had marched 13 miles and bivouacked when at 3 P.M. he received orders to move to the front. At 3-30 be started over a terribly hilly road to Saarbruck. The horse Artillery got over the distance of 15 miles in 3 hours the field batteries in 4½.

(*b*) On the 16th August after completing his march and bivouacking he received orders to move on. The Horse Artillery Brigade did the 7 miles over a hilly country by narrow stony roads in ¾ of an hour, the field batteries took ¾ of an hour longer.

(*c*) At Beaune la Rolande the Horse Artillery Brigade marched 31 miles to the battle field.

Our own artillery is in no way behind in mobility and I may instance the following marches.

(*a*) 2 H. A guns and a Cavalry Regiment covered 14 miles in 57 minutes to seize a bridge at the action of Panipat in January 1886 at the camp of Exercise.

(*b*) Major Turnbull's battery of Horse Artillery after the Campbellpore Cavalry Camp marched from near Campbellpore to Rawal Pindi 47½ miles in 13 hours, men and horses were not distressed.

(*c*) A division of U.-1 R. A. in Februaiy 1887 marched from Nagpore to Jubbulpore 157½ miles in 62½ hours including all halts. Guns only were taken and horses had 10 days preparation.

The success in bringing up artillery so quickly and opportunely in 1870-71 is also much due to the initiative of Artillery Commanders who trotted on at once toward the sound of the guns in action at the front without waiting for orders.

7TH LETTER.

The spirit of caste.

This is a chapter from which all arms of our service have much to learn, Prince Kraft says that up to 1866 the Artillery was looked upon as a "scientific branch" and there was a certain isolation between them and the other arms.

By the regulations every Artillery Officer was strictly forbidden to betray anything whatever of the secrets of the artillery, but as a matter of fact there were no such things as secrets and no special science was required to be a good working Artilleryman; there used further to be a regulation by which every Artillery Officer was made personally responsible for the employment in action and in manœuvres of artillery, even when he had to obey the orders of a superior officer. The material result was that the other arms knew little about Artillery tactics and cared less; they were supposed to be the sort of thing "no fellow could understand" except a gunner.

In consequence of this principle, want of discipline, insubordination, the spirit of contradiction and the art of making difficulties were officially and skilfully taught to the young Artillery Officer. The result was friction between the artillery and the other arms both tactically and socially and artillery thus asserted to itself an independence of action which was a source of danger. Infantry must be always looked upon as the "Army"—the "Nation in Arms." Cavalry and Artillery must always recognise that they are only auxiliary arms to the infantry and can fulfil their object well and rise to their highest efficiency only when they are always conscious of their true character of auxiliaries and have no other aim than to help the Infantry. But if artillery forgets its true position it may become on impediment and a burden. The infantry will not be ruled by the auxiliary arm; in action they will not wait and be shot down whilst the artillery are coming up but prefer to go on without them. The war of 1866 distinctly proved this, when the artillery were generally conspicuous by their absence and the infantry went on without them. On the other hand when the war of 1870-71 broke out a zealous desire was shown both during mobilisation and on the march to make the artillery useful to the other arms and to help them; they had put self assertion aside and never raised difficulties. In 1866 a general once asked for a team from a battery to bring up bread for the infantry and there were loud cries that "the artillery was a combatant arm and not a transport train." In 1870 on the contrary during the early days of the war batteries offered such services of their own accord to help the heavily loaded and wearied infantry. Thus before the battles had taken place in 1870 the artillery was very welcome instead of being looked on as a nuisance and after the first battles, where it had come early into position and in sufficient strength, the good will of the other arms and of the generals naturally increased towards it. Prince Kraft considers the abolition of this "spirit of caste" as an essential factor in causing the artillery in 1870-71 to be brought up in sufficient masses and at the right time. He further points out that the improvement of infantry fire arms has tended as much as anything to abolish caste, as now an infantryman has to master as many scientific principles connected with musketry as an artilleryman has with guns and that the claim of the latter to be a "scientific branch" is more absurd than ever.

Now have we in the British service yet arrived at the abolition of "spirit of caste" and do the cavalry and artillery look upon themselves purely as auxiliary arms and the infantry as the army? On the other hand do the infantry give sufficient consideration to the artillery, do general officers push their guns forward to prepare the way for the infantry attack? Would an infantry regiment not consider it a nuisance to be told off to the drag ropes to help guns over steep or bad ground? Is there not a want of combination in tactics at our field manœuvres? The unprejudiced reader will admit that there is still much to be desired and that the artillery themselves are somewhat to blame. Many officers still cling fondly to the idea that the artillery is a "scientific corps" and that there is something about artillery tactics and shooting which no ordinary infantry man can grasp. A good many majors would not be especially pleased at being asked to strip two wagons after arriving in camp and send them back three or four miles for infantry rations or kits which had broken down. And yet it is by these little services that the branches of the service become cemented together and the spirit of good fellowship takes the place of the spirit of caste. We want the same spirit between branches of the service which animated the 5th Goorkhas and the 72nd Highlanders at Kabul, and the 60th Rifles and the 2nd Goorkhas before Delhi in 1887 and the Rifle Brigade and 4th Goorkhas at Rawal Pindee in 1885.*

8TH LETTER.

How the Artillery learnt to Shoot.

Up to the war of 1866 the Prussian artillery carried out its annual practice very much on the same principle that it was carried on in our own service until quite lately and the importance attached to it may be judged of by the following statement made by Prince Kraft. "I have never up to the time of the introduction of rifled guns known an inspecting general use the effect produced by the fire of a battery as a standard by which to judge of the excellence of its instruction," The cap fits ourselves in a curious manner for up to two years ago little stress was laid on the manner in which a battery shot provided its "turn out" was above criticism.

After 1864 when rifled guns had been introduced to a certain extent the establishment of a "School of Gunnery" began to be talked about and was tentatively established as an experiment, it had however produced no effect when the war of 1866 broke out.

This war produced the conviction that had the artillery been properly instructed the effect of the gun would have been much greater. The "School of Gunnery" was permanently established in 1867, and based on the experience of two years the new "Regulations for Inspection of 1869-70" were brought out. The main feature of the practice was its practical character and its assimilation to war conditions as far as possible viz :—

(I.)—Targets represented troops as far as possible.
(II.)—Moving targets on rails were used either advancing or moving across the front directly or obliquely.
(III.)—Plenty of ammunition was allowed.
(IV.)—Targets were moved daily and ranges varied (unknown ranges.)
(V.)—Only men with good eyesight and with aptitude for it were allowed to lay.
(VI.)—Batteries were brought up into action after long and rapid marches as on service.
(VII.)—In firing at many objects batteries were taught to get the range by trial shots on some point which the object must pass and then to lay all their guns on that point and fire when the object reached it or approached it;

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* At Rawal Pindee in 1885 the Rifle Brigade turned out and pitched the tents of the 4th Goorkhas on the latter regiment marching into camp.

with an object advancing on the battery this was easy but with objects moving laterally more difficult. It was found that independant firing produced more effect than salvoes.

(VIII.)—It was laid down as a principle that ordinarily against infantry, slow fire from a flank should be employed; against a target moving quickly (such as cavalry) rapid fire from a flank. Salvoes were forbidden.

Thus when the war broke out in 1870-71 the artillery had had the advantage of very systematic instruction under as nearly as possible service conditions and the fruit borne is shown from the following incident. When standing behind the captain of one of his batteries in action Prince Kraft heard him quietly give the order when troops were advancing to the attack "Against infantry in front, 1900 paces from the right flank.—Ready.—Fire one gun." When the enemy reached the point to which the range was taken he gave the order "Rapid firing from the right flank." When notwithstanding terrible loss the enemy had passed the known point and continued advancing the captain gave "Cease firing" then 1600 paces, fire one gun, and cease firing. When the enemy reached the new point he gave "1600, paces from the right flank, rapid firing." The effect was brilliant, horrible and overwhelming. No attack could have resisted it.

Complicated movements on the drill ground were also abolished and all hurry in coming into action and getting a round fired off strictly forbidden. Batteries were practised in getting over long distances at a good pace, but when they arrived in position, unnecessary hurry was not permitted and guns were only allowed to fire after most careful laying.

Now in our service we have a "School of Gunnery" at Shoeburyness; experiments at Okehampton for field artillery and at Lydd for seige artillery, but we seem to want something more. We require tactical instruction combined with training in shooting under service conditions. This in England is somewhat difficult; want of suitable ground and the expense of bringing many batteries together being the chief difficulty. In India we have no school of gunnery and the first purely artillery instructional camp was held in 1886-87 at Campbellpore and the second in 1887-88 at Kushairi; shooting at moving targets has been introduced but is not yet systematized. The question of the simplification of the drill books has engaged the attention of the authorities in England and it is to be hoped that artillery tactics will be considered worthy of more than three pages out of 376 in the next "Manual of Field Artillery."

9TH LETTER.

On the renewal of Ammunition in time of war.

In the war of 1866, the old regulations were still in force in the Prussian service. With regard to the ammunition wagons forming part of the battery it was laid down that they were to be formd with the spare carriages into two lines; the 1st consisted of two or three ammunition and one store wagon which was to follow the battery at 300 or 400 paces, the 2nd line which included the remaining wagons was to follow out of fire at least 1000 paces from the battery. Such a system naturally resulted in batteries being often cut off from their ammunition wagons. It was found in practice that other troops would not make way for Ammunition wagons.

The system of replenishing ammunition from the ammunition columns was for each battery after the action to send in a "state" of remaining ammunition in accordance with which the ammunition was made up; the result of this system, with the ammunition columns far in rear, was that a battery might be three or four days before being able to replace its expended ammunition, owing to the ammunition column not having received orders and being unable to supply without; a battery might thus be obliged to enter on a new action greatly deficient in ammunition and *yet no one might have been to blame.* Prince Kraft learnt in 1866 *"never again to allow batteries to be separated from their wagons."*

In 1870, on the march a wagon followed each gun, the extra carriages following in rear. On forming line the wagon followed the guns and the spare carriages formed as a third line. When a battery was about to advance into position for action the order was given "Form lines of wagons." The guns pushed on as soon as they came within reach of the enemy's fire. The first line of wagons (three ammunition and one store wagon) followed close behind them. The second line (three ammunition wagons, forge and baggage wagons) were collected from the whole brigade placed under an officer and posted at a point selected by the officer commanding the brigade.

When the battery unlimbered the first line *took up a position on the left of the guns on the same front and with the same intervals.*

It was established as a principle that *the ammunition in the wagons should be used first and that in the limbers kept as a last reserve*; as the wagons of the first line were emptied they returned to the collected wagons of the second line and one by one were replaced by a full wagon from this line. The empty wagons were sent to the ammunition columns, to be filled up as soon as they had reached their proper position.

At St. Privat and Sedan Prince Kraft found the gun limber boxes all *full* during the action. At St. Privat in accompanying the infantry to the assault the batteries reached the captured heights between St. Privat and Amanvilliers with *full limber boxes.* This proved most useful. When the limber ammunition had to be expended it was filled up from the wagons at the first opportunity. In spite of the enormous expenditure of ammunition of the 15 batteries of the guard (averaging 100 rounds per gun) it was not until late in the evening that one or two of the heavy field batteries (which necessarily had less ammunition) began to feel embarrassed.

The renewal of ammunition from the ammunition columns was as follows :—

Each artillery corps had nine ammunition columns divided into two lines. The first line consisted of two infantry and one artillery column (reversed after St. Privat) which followed the corps half a days march in rear; the second line comprising the other six columns was a whole march in rear. The officer commanding marched with the first line and received orders from the officer commanding Corps Artillery, who again received instructions from the General Commanding the Corps. The transmission of orders was a great difficulty sometimes entailing orders having to be sent 23 to 27 miles in order to carry to the ammunition columns the orders for next day. The only feasible method was by a flying line of relays of orderlies between Head Quarters of the Corps, the Head Quarters of the Corps Artillery, the Head Quarters of the commanders of columns and between the two lines of columns.

The difficulties under which the ammunition columns struggled with blocked roads etc., may be imagined; without going into the details given by Prince Kraft the following instances of the work done will give some idea of the tremendous efforts made by them to keep up the supply of Ammunition.

(I.)—After the battles round Metz the ammunition columns of the guard had to return to the Prussian fortress of Saarlouis to replenish. Thence they marched West and hearing that the Guard Corps now formed part of the army of the Meuse hurried after it by forced marches. They did this without receiving a single order for no one with the guard corps knew where they were. Prince Kraft says—" I thought I was dreaming when, on the 29th August I received a report that the first of these columns had come up with the Corps. On the 31st August the evening before the battle of Sedan they had all arrived. The 1st column had marched 200 miles in 10 days, the 2nd 230 miles in 12 days, one day in each case having been taken up with receiv-and packing the ammunition.

(II.)—After Montmedy on the 5th September all the ammunition columns were again empty; the greater part of them had to return to Saarlouis. On the 19th September when the Guards arrived before Paris the 1st of these columns rejoined. It had in 14 days covered 320 miles though meeting with many delays and stoppages. Horses expended were requisitioned by the way and they arrived complete in every particular.

These performances are the more remarkable as after the battles round Metz the batteries were made up with officers, men and horses from the ammunition columns and the latter placed in charge of reserve cavalry officers of the guard who had been attached to them. They were left to replace the horses taken as they marched back by requisition.

In our service in England we have no organisation for artillery ammunition columns, in India we have an organisation by which wagons are attached to certain batteries and brought together on war breaking out.

In England batteries are broken up and turned into ammunition columns when required. The importance of the supply of ammunition in the field whether for artillery or infantry cannot be over estimated. In fighting against savage foes, ill armed and without discipline we have never been in a position when the want of a system has been much felt, but if we ever have to meet a European army in the field the conditions of warfare will be wholely changed. The question is one which is now engaging considerable attention and we cannot too soon have some established system for

(I.)—Expending ammunition in action.
(II.)—Renewing the ammunition in battery wagons.
(III.)—Replenishing the ammunition columns from the Ordnance Field Park.

Whatever regulations are laid down let us reduce clerical work to a minimum. The critical moments when ammunition has to be filled up in battery wagons, from the columns, or in the columns from the Field Park is no time for filling in elaborate forms; the very simplest forms of receipt are a necessity; whole wagons of ammunition should be handed over bodily whenever practicable.

10TH LETTER.

How the Artillery saved itself during the last war.

Prince Kraft commences this letter by pointing out the absurdity of the exercises under heading of "Disabled Ordnance" which used to find a place in the German Drill Regulations and still do so in our own. One of them is to lash a stout spar or a couple of shafts under a broken axletree in order to retain a gun in action. He once saw this tried in peace time and the spar broke like a tooth pick from the recoil amidst general laughter. Other exercises are slinging the gun under a limber or wagon and placing the carriage which is supposed to be disabled on the top. In the four campaigns of 1864, 1866, 1870, and 1871 Prince Kraft never saw or heard of such a manœuvre being carried out.

In the war of 1866 disgrace still attached to any one who lost a gun, since the time of the war of the Liberatian this was considered a heinous fault. Though a gunner should die rather than lose his gun nevertheless it is better to lose a gun than to lose a battle. In 1870-71 the Prussians lost guns in action but how great was the glory which these losses brought to the troops which suffered them.

In 1870-71 no guns were allowed to be withdrawn from action to refit. Prince Kraft considers that as regards the employment of artillery as such, it would be desirable that a gunner should have no other arm than his gun.

Artillery should save themselves by their fire and look upon their gun as their sole source of safety.

During the war of 1870 an officer in high command was riding quietly between his batteries whilst the guns were being charged by cavalry, his adjutant asked him whether he would not draw his sword; he answered "I will take very good care not to do so, otherwise every gunner will draw his, instead of laying and firing and then the cavalry will be sure to ride over the battery."

The charge died away at 50 paces from the guns.

There are however other reasons why a gunner should be armed though in action he should trust to his gun alone.

Artillery will, can, and must hold its ground though the enemy's infantry come to within 1000 or even 500 paces. It is at this very moment that it offers the best support to its own struggling infantry and will perhaps so decimate the superior masses of the enemy that they will give way. If artillery are suddenly surprised at a close range by infantry they cannot retire, the only chance is to drive back the enemy by fire.

Artillery must never retire while a hostile attack is advancing against it. *This is the most favorable time for good fire effect.* If artillery has to retire they must take advantage of a pause in the attack when the enemy is checked by their fire and is awaiting fresh troops to renew the attack.

On these principles the guns held their ground at Spicheren and Vionville; on these principles guns were gloriously lost near Amanvilliers at Beaune la Rolande, and on these principles no guns were lost at Coulmiers though the battle went against the Germans.

In our service we have not as yet accepted the principles learnt by the Germans although 17 years have elapsed since 1870-71. We still see excited umpires riding up to batteries at manœuvres and saying "You must retire, sir, don't you see infantry firing at you at 1200 yards?" Prince Kraft says "There were hundreds and thousands of cases in the war of 1870-71 where artillery which refused to retire could not be driven back by infantry fire." *If artillery wishes to "save" itself, it must kill its enemy by its fire. This is the only safety. If acting thus it does not save itself, it will at least save its honour.*

11TH LETTER.

General von Hindersin.

Prince Kraft devotes a letter to a short biography of General von Hindersin and says "The driving wheel of reform, the soul of the movement which seized the artillery after 1866 was no other than the Inspector General himself, General von Hindersin. This man who was at the head of the arm was an original phenomenon.

12TH LETTER.

Principles for the future employment of Artillery.

In future, whenever the ground offers a free and open field of fire the artillery fight must be commenced at from 4500 to 5500 yards, but whenever possible artillery should be pushed closer. Decisive effects can only be expected at ranges under 3800 yards, but this range is still so great, that an advance to still shorter ranges will be necessary whenever decisive action is desired. Even now the fire of guns is not absolutely destructive except between ranges of 1600 and 1000 yards.

When engaged with infantry, artillery should, if it has the chance, taken up a range over 1600 yards, but in the course of the action it must not hesitate to expose itself to infantry fire at 1100 or 1200 yards. Artillery should avoid advancing nearer than this to unbroken infantry when fighting alone, but against disorganised infanty or when fighting with other troops it must not shun the very shortest ranges, especially on the defensive. It is never hopeless to drive back the enemy by fire alone even from the muzzles of the guns.

The duties which artillery have to fulfil are still the old ones:—

(1).—To commence the action.
(2).—To lengthen out the fight.
(3).—To prepare the decision.
(4).—To draw off the enemy's artillery fire from the other troops.
(5).—To pursue the beaten enemy.
(6).—To form a rallying point for the other troops.

To carry out these objects the Officer Commanding the Artillery must be in permanent communication with the officer commanding the troops and keep himself acquainted with his intentions.

The increased range of field guns,—the Prussian range tables go up to 7700 yards,—has increased the sphere of effect of guns and will lead to a yet earlier employment of the whole artillery.* The introductory cannonade will probably last longer than formerly, being carried out at longer ranges. The decisive fight between the two artilleries will however last a shorter time on account of the increased effect of shrapnel fire. The energetic action of the infantry should be immediately combined with the decision of the artillery fight, before the enemy's artillery has recovered itself and is again ready for action. Then the artillery will follow the infantry into close action, support it there and lastly secure possession of the captured position and take part in the pursuit.

Troops acting on the offensive are naturally used in the order in which they come up and the difficulty of passing long columns on the road in an enclosed country is well known, it therefore follows that artillery must march *as far to the front as possible.* The reasons for this, already strong in 1870, have increased with the extension of the sphere of effect of fire.

The following points must be brought into special prominence.

(1).—*Artillery must seek for the crown of its efficiency in learning to shoot well.*

(2).—*Artillery must be able to get over long, very long distances even many miles at a fast trot either in column of route or in line, in order to be able to bring masses into position at the right moment.*

(3).—*On no account whatever is the 1st shot to be fired as quickly as possible after unlimbering. No time should be lost*

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* Our 9 pounder is wholely ineffective to carry out the tactics given above. In India we have only 3 batteries of the new 12 pounder R. B. L. gun and only 6 or 7 more are promised this year, when the remaining batteries are to be armed is unknown. "*Vide* Parliamentary Reports."

but the most important thing is that the 1st shot shall be well laid and well observed.

(4)—In future artillery will probably expend a larger amount of ammunition and it is a matter of the first importance *that the ammunition shall never fail and that, above all, it shall not do so at critical moments.* Under this head the advantage of having only one calibre for your field artillery is very great as a battery which expends all its ammunition can be supplied from any other battery.

13TH LETTER.

Concerning the proposal "That artillery fire should not commence at an earlier moment than shortly before the Infantry fight; but that it should then at once begin at such a range that its effect will be annihilating."

Taking into account the murderous effect of field artillery, one is inclined to come to the conclusion that the destruction of the enemy will in these days take place in a shorter time than formerly and that thus supposing the infantry attack is intended to follow immediately after the completion of the artillery fight, the commencement of the battle must be deferred until the infantry have arrived sufficiently near to make use for their assault of the moment when the artillery has produced its must favorable effect and that thus the disorganised enemy may not have time to avoid the assault or recover from his disorganisation.

Let us imagine what would happen if this was attempted and assume that artillery acting on the offensive wait before opening fire until within ½ an hour of the moment at which the infantry would begin an energetic fire from the firing line (say at 500 yards) and at once open fire at 2000 yards. In half-an-hour infantry meeting with obstacles and moving on a broad front will certainly not cover more than 1500 yards and therefore when the artillery opens fire the infantry will be about level with it. But as we may presume that the enemy acting on the defensive have equally long range weapons how can we suppose that they will allow these 2 arms to approach to within 2000 yards, when they can open upon them with shrapnel at 3700 yards. Naturally the infantry will say, "What is the use of our artillery if it cannot keep that of the enemy from us." The object of the defence is to keep the enemy at a distance and make him deploy as early as possible by opening fire at long ranges. Once deployed the enemy is to a certain extent committed to a certain line of attack. The defence owing to the large range of modern artillery will have latitude and will be able, if desired, to decline the combat and withdraw much more easily than formerly. It will thus result, that the artillery of the defence will open fire at very long ranges and that the artillery of the attack will be forced to reply in order to draw the fire of the artillery of defence on to itself and cover the advance of the infantry.

It is a well established fact that the losses in battles are gradually getting less with the improvement and increased range of fire arms. Since gunpowder has replaced arrows and lances losses have been considerably reduced. The reason appears to be clear, namely, that in the old hand to hand fights of the Romans and the battles at the commencement of the century when the extreme range of the musket was 300 yards and bayonet charges were frequent, combatants when once engaged could not get clear of each other. On the other hand in the present day when artillery are effective at 3000 yards and infantry fire at 1000—1200, it usually happens that when losses begin to be heavy one side gives way; it must also be remembered that owing to the depths of modern formation, only the front line is actually engaged and the remaining lines can be easily withdrawn from the engagement. On the other hand in the days of the old line tactics and the heavy columns of the later Napoleonic wars the greater part of the army became simultaneously engaged and retirement meant defeat with heavy slaughter. Following this law we may expect to find in future battles that it will be impossible for artillery to at once advance and open fire at ranges (2000 yards) at which their fire is now annihilating. Artillery will be unable to advance to decisive and annihilating ranges until it has established its superiority over that of the enemy at the longer ranges or when the ground especially favors its advance.

Another chief argument against the system proposed at the head of this letter is that we cannot guarantee that in the short ¼ or ½ an hour from the time of opening fire to that at which the infantry make the final assault, the artillery will have produced any decisive effect on the enemy. It may not have got the range quickly and may be making bad practice without knowing it. The smoke from our own guns and that from the enemy's renders it very hard to judge of the effect of the first shots, in war there are many disturbing elements and appearances are often very deceptive owing to folds of ground etc. Let us imagine the fate of the infantry who attack a position unbroken by artillery fire owing to mistakes or misconceptions as noted above!

Prince Kraft then draws the conclusions that in future battles the artillery fight will be carried on as formerly only the ranges will be longer.

It will commence with a cannonade at 5000 yards or even at greater distance more or less ineffective, but intended to draw the fire of the enemy's artillery off the advancing infantry. Under this cannonade the officer commanding the troops will decide where he proposes to make his real attack. When he has made up his mind the artillery will advance to the edge of the shrapnel zone (3500 yards) and endeavour to obtain the advantage in the combat with common shell. The moment this advantage becomes palpable will be the earliest at which the officer commanding will be able to determine when he will commence the attack. The artillery will now resolve to engage in the decisive artillery duel and advance by successive fractions, using shrapnel fire. If the defenders artillery is silenced the time will have come to let loose the infantry; which will reach the enemy ½ an hour after [illegible] of the artillery duel. It will advance the last 1500 or 2000 [illegible] der cover of shrapnel which should be used to shatter the [illegible] infantry, for this purpose the artillery will advance with its [illegible] by successive fractions.

[illegible] st however be remembered that ineffective cannonades at [illegible] distances should not be permitted, it is waste of ammunition [illegible] enemy begins to *hit* then we *must* answer him.

14TH LETTER.

Should Artillery avoid in future the zone of Infantry fire.

[illegible] this letter there is a good deal of repetition, for the desirability of [illegible] of the attack supporting infantry in the attack and accompanying it into the zone of the enemy's infantry fire has already been [illegible] commented on and recognised as a necessity. One of the highest [illegible] authorities in criticising some manœuvres when the artillery of [illegible] had avoided the zone of infantry fire said, “that is of no use, [illegible] may shoot as far and as well as it likes, it must at the last [illegible]

[illegible] former remarks on the subject Prince Kraft only spoke of the [illegible] the offensive. On the defensive it is accepted that, when [illegible] artillery should be placed in position 500 yards behind the [illegible] firing line, but here artillery will not be always able to avoid [illegible] of infantry fire and some few bullets will reach it at a range [illegible] than 1000 yards up to 1600 yards.

[illegible] however the artillery of the defence hold its ground when [illegible] infantry drive back the firing line of the defence, and are [illegible] so close as to threaten the safety of the guns?

[illegible] may assume that if it give way and falls back it will be owing [illegible] periority of the enemy. But such an advantage to the enemy [illegible] conceivable after a very long and hot fight in which the artillery [illegible] defence will have suffered very severely from shell, shrapnel and [illegible] and *it will no longer be in a position to fall back rapidly.* Still [illegible] important is the moral effect which will be produced by the retire- [illegible] the guns at this moment. The infantry will have brought up [illegible] reserves and be making a supreme effort to check the attack and [illegible] back, if at this moment the guns retire *the temporary check [illegible] into a total defeat,* as no artillery will be left as a rallying [illegible] for the infantry.

What would have happened at Vionville if the great artillery line [illegible] out of the zone of infantry fire when temporarily thrown on [illegible] defensive? Would the victory at Beaune la Rolande have been [illegible] if the artillery had shunned the zone of infantry fire?

The nearer the enemy's infantry approaches the more certain will [illegible] artillery fire and the more destructive the rush of shrapnel through [illegible] ranks of the infantry; should the latter ever push up to the muzzles [illegible] guns, then fire will even beat him back at the last moment.

It is thus still less desirable on the defensive that on the offensive [illegible] artillery should avoid infantry fire and this more especially when

It is [illegible] getting [illegible] with [illegible] 300 yards and [illegible] engaged [illegible] present day [illegible] at [illegible] way [illegible] to advance for [illegible] instead [illegible] when the [illegible]

As [illegible] of [illegible]

[illegible]

It [illegible]

the end of the artillery duel. It will advance the last 1500 or 2000 yards under cover of shrapnel which should be used to shatter the enemy's infantry, for this purpose the artillery will advance with its infantry by successive fractions.

It must however be remembered that ineffective cannonades at enormous distances should not be permitted, it is waste of ammunition but if the enemy begins to *hit* then we *must* answer him.

14th LETTER.

Should Artillery avoid in future the zone of Infantry fire.

In this letter there is a good deal of repetition, for the desirability of the artillery of the attack supporting infantry in the attack and accompanying it into the zone of the enemy's infantry fire has already been strongly commented on and recognised as a necessity. One of the highest military authorities in criticising some manœvres when the artillery of the attack had avoided the zone of infantry fire said, "that is of no use, the artillery may shoot as far and as well as it likes, it must at the last *go in*"

In his former remarks on the subject Prince Kraft only spoke of the artillery on the offensive. On the defensive it is accepted that, when possible, artillery should be placed in position 500 yards behind the infantry firing line, but here artillery will not be always able to avoid the effect of infantry fire and some few bullets will reach it at a range of more than 1000 yards up to 1600 yards.

Should however the artillery of the defence hold its ground when the assailants infantry drive back the firing line of the defence, and are advancing so close as to threaten the safety of the guns?

We may assume that if it give way and falls back it will be owing to the superiority of the enemy. But such an advantage to the enemy is only conceivable after a very long and hot fight in which the artillery of the defence will have suffered very severely from shell, shrapnel and rifle fire and *it will no longer be in a position to fall back rapidly.* Still more important is the moral effect which will be produced by the retirement of the guns at this moment. The infantry will have brought up its last reserves and be making a supreme effort to check the attack and drive it back, if at this moment the guns retire *the temporary check will develope into a total defeat,* as no artillery will be left as a rallying point for the infantry.

What would have happened at Vionville if the great artillery line had retired out of the zone of infantry fire when temporarily thrown on the defensive? Would the victory at Beaune la Rolande have been gained if the artillery had shunned the zone of infantry fire?

The nearer the enemy's infantry approaches the more certain will be artillery fire and the more destructive the rush of shrapnel through the ranks of the infantry; should the latter ever push up to the muzzles of the guns, then fire will even beat him back at the last moment.

It is thus still less desirable on the defensive that on the offensive that artillery should avoid infantry fire and this more especially when their own infantry has been driven back. With its improved projectiles since 1870-71, Artillery can now count with more certainty than ever upon the impenetrability of its front.

15TH LETTER.

On some Artillery questions of the day.

1.—*On Reserve Artillery.*

It is said of cavalry that the leader who keeps the last squadron in hand wins the day, but the reverse is now the case with Artillery and it may be said whoever has brought his last gun into action and has thus established a superiority of fire wins the day. A single additional battery which can outflank the enemy's line and bring a flanking or oblique fire to bear at the very commencement of a fight, carried on at effective shrapnel range, may turn the scale.

The reasons for the abolition of the reserve are as follows:—

(I.)—Owing to the long ranges in the first phases of the fight, artillery can be withdrawn and moved to another part of the line if required. They are still in hand and not "expended" as they were in the old days of S. B. guns.

(II.)—The ranges of field artillery being so much greater, they command a much larger area of the battle field and can be turned with effect on various objects in their front.

(III.)—In an army one or two entire Army Corps will be kept in reserve, thus furnishing a sufficient reserve of artillery. These batteries will be sent forward as required (3rd Corps at Vionville.)

(IV.)—The effect of artillery is now so great that the absolute necessity exists for endeavouring to establish a superiority over that of the enemy.

(V.)—On the defensive guns will only be maintained in reserve so as to enable them to be used to the best effect against the attackers artillery, and every effort should be made to crush it by artillery fire.

2.—*On finding a range from a position in rear.*

Supposing a battery is in action at a point 5000 yards (A.) and a good position exists at about 3000 yards from the enemy (B) it has been proposed to find the range of B. from A., then on coming into action at B. the battery would know its range. Prince Kraft does not approve of this at all and has the following objections to offer:—

(I.)—You may be deceived in the range from A. to the enemy's position

(II.)—The enemy's artillery may appear to be on one line, but his batteries may be at different ranges—a very probable contingency.

(III.—In advancing at a gallop or trot you may fail to find the place to which you have taken the range.

(IV.)—When seen from the rear the new position B. looked suitable but on reaching it you find you cannot see the enemy.

(V.)—The position may be found to only suit two or three guns.

3.—*On the use of salvoes by batteries.*

Prince Kraft considers salvoes of shrapnel on taking up position or in fact salvoes at all a waste of ammunition and that steady firing from a flank is the best kind of fire and the only manner in which the officer commanding a battery can keep the fire under command; he can then tell whether each gun has been properly laid, the fuze properly set or in fact he can see where the mistakes are made and who makes them; besides no more shell can be thrown into the enemy by salvoes than by firing from a flank. He however approves of a proposal to allow batteries of a brigade to fire salvoes with tangent scales at different elevations, in order to find the range; he would however only allow this when the artillery could take up a position under cover hidden from the enemy, so that each gun could be carefully laid and thus the accuracy of the salvo guaranteed.

4.—*The occupation of a position in échelon.*

The occupation of a long line in échelon of batteries is much in favour, where the wind blows from a flank and drifts the smoke of one battery across another; it also conduces to mislead the enemy as to the range. Prince Kraft however considers that eventually the batteries should be brought up into line:—

(I.)—In order to give a free field of fire to all the batteries.

(II.)—Because it has not a good moral effect for part of the batteries to remain further from the enemy than the rest.

5.—*On diagonal fire.*

Every endeavour should be made to bring enfilade or oblique fire on the enemy's artillery, nothing produces more effect, both moral and actual. For this reason every effort must be directed to outflank the enemy's position even if this can be done on one flank only. Prince Kraft however does not consider it within the bounds of human nature to expect guns on the right flank to fire at the right flank of the enemy's line. The natural tendency is to fire at what is in your front, moreover it would be next to impossible to observe and correct your fire.

6.—*On cover for limbers and guns.*

The most recent German regulations say nothing about this point and Prince Kraft states that in all his campaigns he has never allowed his limbers to quit their regulation position behind the guns. Any other position is too far off.

With regard to guns it is a well known fact that artificial cover is desirable, but if the earth is soft and gunpits are made the recoil with shell is so great that probably the gunpits will have to be abandoned. This does not occur with blank cartridge. For these reasons it is better to place guns on the natural surface of the ground and to use undulations, bushes, hedges, walls etc.

7.—*On Horse Artillery.*

Before 1870-71 it was by many considered in Germany better to give up horse artillery altogether and supply its place with field carrying its detachments on the carriages. *The experiences of the war* entirely silenced these suggestions. Van Dresky on the 6th August had marched his Corps Artillery 16 miles in the morning in a hilly country and had to move off again at 3 P. M.; his horse artillery covered 20 miles to the battle field in three hours, but his field artillery took 1½ hours longer *and arrived too late.** His horse artillery again at Beaune la Rolande just reached in time to take part in the battle, after a march of 32 miles.

8.—*On the abolition of Corps Artillery.*

Prince Kraft says that it has been proposed to abolish "Corps Artillery and divide it equally between the two Divisions of the army corps but condemns this in an unqualified manner:—

(I.)—The unity of command of the artillery of an army corps would be destroyed and its staff abolished.

(II.)—A great want would be felt tactically for now in combination with the divisional artillery it produces a tremendous effect whereever the General Commanding the Army Corps pleases to use it and prepares the way for the main decisive action. If divided up into divisions its use would be entirely under divisional commanders.

16TH LETTER.

On the Drill Regulations.

Drill is only a means to an end and consequently drill regulations must contain much that is of no use in war. The advantage of drill as a factor in discipline and steadiness are undeniable and there is no doubt that a well drilled battery will be most under discipline in the field, more attentive to words of command and instruction, and will consequently be cooler and in a better condition to shoot well. Simplification of drill however on service is essential and none but the very simplest manœvres will be attempted. Prince Kraft therefore proposes that in the regulations the movements which are to be used in peace should be distinguished from those which are possible in war and this seems an eminently practical suggestion. Intricate manœuvres in peace time as instruments of training, instruction and facility in driving may perhaps be allowable but they cannot be attempted on service.

These remarks are especially applicable to brigade drill; in brigade manœuvres even in peace the greatest simplicity should be observed. Drill movements in brigade in war are seldom possible, nor will they even be necessary. Batteries will move into action under the command of their captains (Majors) who should receive personal instructions from the officer commanding the brigade or receive them through the adjutant. The commanding officer of Brigade will himself direct the advance of the first battery into the position.

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* **Those who have lately reduced our horse artillery, please note!**

17TH LETTER AND LAST.

The answer of the Correspondent, giving a Summary of the Preceeding. Letters.

(With apologies to the R. A. Institution and Major Walford I am induced to publish this last letter in full as it contains the essence of all the letters and it appears desirable to make these precepts as widely known as possible, especially to Cavalry and Infantry Officers who have not access to the R. A. Institution Journal.)

"I have waited three months before answering your last letter of September. This is because I have several times re-studied your 16 letters on Field artillery. Your ideas wander from one subject to another, like a hunter seeking for game, who follows it as he finds it. I have therefore taken the trouble to make extracts from, to recapitulate and to summarize what you have written. Will you kindly tell me if I have rightly expressed your meaning in the arrangement of the following list of contents:—

I. Concerning the CLAIMS WHICH AT THE PRESENT DAY WE MAKE ON THE ARTILLERY.

1. The first may be said in three words. The artillery must in the first place *hit*, in the second place *hit*, and in the third place *hit*. In this is included all that has to do with the most correct service of the guns, the most accurate observation of the fire and the most exact correction of the elevation and deflection

2. It must next be in a condition *to come into position at the right moment*, and, with this object, it must practice itself in getting over distances of many miles, and even forced marches of a day or so, at a rapid pace.

If it can satisfy these claims, it will give us everything which is needed as to its fitness for employment in battle.

II. With regard to the CONDUCT OF ARTILLERY IN ACTION the following rules are laid down:—

1. General rules.

(*a.*) Artillery can produce its full effect only on condition that it always remembers that *it is an auxiliary arm to the other troops.*

(*b.*) It must use every effort to avoid all ineffective cannonades, and must thus *always go in as close as possible to the enemy.*

(*c.*) Nevertheless it will, on account of the present condition of the improvements in ordnance, be as a rule necessary *to begin the artillery fight outside of the zone of effective shrapnel, and thus at ranges over* 3800 *yards*

(*d.*) *But the decisive artillery duel will be fought out at a range of from* 2200 *to* 2700 *yards.*

(*e.*) Artillery must also *always fire at the other arms*, as soon as they are seen within the zone of its effective fire. But, since the other troops of the enemy will get as much cover as possible from the nature of the ground, and will, even if they be once visible, soon disappear behind cover, *the combat of artillery with artillery will occupy,* *during the greater part of the duration of a battle, the attention o this arm.*

(*f.*) *Artillery must not hurry when it opens fire,* and must adher exactly to the regulation system, *so that the Captain of a battery ma have full command of his fire.* It must avoid refinements, such a salvoes (except as range-finders), finding the range from a position i rear, and diagonal fire, &c.

(*g.*) Artillery must endeavour *to fight as a rule by entire brigade* The use of single batteries must be exceptional. Nevertheless, entir brigades must not be taken into action by one word of command or b the sound of one trumpet, but should be guided *by orders or instructio given personally by the officer commanding the brigade to the Captains o batteries.*

(*h.*) *Artillery must never be without ammunition.* The punctua renewal of ammunition is a condition of its existence. It must there fore use every endeavour *to keep its limbers always full.* The limbe ammunition must be considered as the *last reserve of ammunition,* an must thus, whenever possible, be filled up.

If nevertheless ammunition fails, artillery must remain in positio (silent, until it can succeed in procuring a fresh supply), so long as i receives no order to retire.

2. On the offensive.

(*a.*) Artillery, after it has silenced the enemy's artillery, must n as a rule approach *nearer than from* 1600 *to* 1700 *yards to infantry o the enemy which is as yet intact,* and is not engaged with other troops.

(*b.*) *If the enemy's infantry is held in check* by another force o artillery, or by infantry, it is not only advisable, *but it is the duty o artillery,* to advance to a range of from 1100 *to* 1200 *yards.*

(*c.*) *At the most decisive moment of the action artillery must no shun the very closest range.*

(*d.*) As soon as the main attack has proved successful, the artiller must hasten up to secure the captured position by its fire. At such a moment, *its proper place, in most cases, is in the line of skirmishers.*

3. On the defensive.

(*a.*) The normal post for artillery in a defensive position (thoug this may be modified by the character of the ground), is 500 *yards i rear of the foremost infantry position,* provided always that the latte leaves the field of fire of the artillery open.

(*b.*) Artillery must *never abandon* its position, even if the enem come up to the muzzles of the guns, *unless the officer commanding th troops has given orders for a general retreat.* But this does not impl that artillery, acting on the defensive, are forbidden, if the assailan begins to get the advantage in the artilley duel, to cease firing for time and to withdraw their guns under cover, with the object of sud denly coming into action again at the most critical moment.

(*c.*) If the order to retreat is given, the only possible moment a which it can be commenced is *either when the enemy has not yet advance*

to the attack, or when he is preparing a second attack after having been repulsed in the first.

4. Horse artillery in a cavalry action.

(*a.*) As a rule *the Horse artillery should go in at once to a decisive range for the artillery duel*, since the considerations which compel artillery when engaged with infantry to fight at longer ranges, lose their force in this case, owing to the speed at which cavalry can move. From this position it will silence the enemy's artillery, and immediately afterwards, or as soon as it can see them, it will turn its fire on the enemy's cavalry.

(*b.*) *During the charge* of its own cavalry, it will fire on that of the enemy, or, if that be not possible, on his artillery. If it has nothing to fire at, *it will remain in position with loaded guns*, (common shell and shrapnel should be used), in order, in case of the failure of the charge, to give support to its retiring cavalry, and to show them where they are to rally.

(*c.*) The Horse artillery requires a *special escort* on that flank of their position only on which the cavalry fight is not taking place, and even there it requires it merely for the purpose of scouting. A section will therefore be sufficient.

(*d.*) *If the charge succeeds, the Horse artillery must gallop up to the spot where it took place*, in order to secure its possession with their fire, and to assist in the pursuit.

III. ORGANIZATION.

The following appears to be a very desirable organization for the artillery :—

Each army-corps to have 3 regiments of artillery ; of these 2 to be of Field artillery, and to consist each of 2 brigades of 3 batteries ; the 3rd to be a regiment of Horse artillery, and to consist of 3 brigades of 3 batteries. If with this organization we find that we are weaker in Field-guns than the neighbouring States, I should propose to increase the number of batteries in a brigade of Field artillery to 4.*

On mobilization one regiment of Field artillery would be attached to each infantry division, and a brigade of Horse artillery to each cavalry division. The remainder of the regiment of Horse artillery would form the corps-artillery.

IV. THE EMPLOYMENT OF ARTILLERY BY LEADERS OF TROOPS.

(*a.*) It must be laid down as a first principle, that any serious *artillery action* (I except of course skirmishes, slow cannonades, feints, &c.) *must be opened with a number of guns superior from the first to that of the enemy.* The excess over this strength will always be employed in outflanking the enemy, with the object of enfilading him. The improvement of artillery fire has increased the weight of the reasons against the retention of an artillery *reserve*, which even in 1870 *appeared undesirable.*

(*b.*) If this principle be observed, the distribution of the artillery will be as follows :—

***NOTE.—This would give 21 or 25 batteries per army-corps, of which 9 would be Horse-artillery. We have 15 batteries, of which 4 are Horse-artillery. N.L.W.**

1. *The advance-guard of an army-corps*, which consists of a brigade[*] of infantry, will have a brigade of Field artillery attached to it. The other brigade of artillery will remain with the second brigade of infantry.

2. *A complete infantry division* will receive a regiment of Field artillery.

3. *The corps-artillery* will, as a rule, come into action *as a whole.*

4. *The advance-guard of an infantry division*, of the strength of a regiment,[†] will be given *one battery.*

5. The artillery belonging to *a cavalry division will, as a rule, remain massed with the main-body.* But as an exception, when it has been foreseen that the advance-guard brigade will be required to fight as well as to scout, artillery will be given to it. Under these circumstances it may happen, especially when it is necessary to force defiles which are occupied by the enemy, that the whole brigade of artillery will be sent forward to the advance-guard.

If the cavalry division is present at a battle, it will send its Horse artillery into the fighting line of artillery, in order to assist the latter in attaining a numerical superiority.

6. *Rear-guards* will be supplied with artillery on the *same principles* as obtained in the case of advance-guards. But if a rear-guard is intended to delay the enemy, it may happen, that considerably more artillery may be attached to it; possibly even the whole of the corps-artillery.

7. For *detachments* the same principles as for advance-guards will apply, having regard to their strength and numbers.

8. *The breaking-up of a battery* is to be avoided as far as possible. Detached divisions may very exceptionally be employed in street-fighting, in expeditions against an armed civilian population, etc. A single gun is no gun at all.

(*c.*) *The position of artillery on the march* is closely connected with its distribution among the tactical units. Thus the artillery of the advance-guard of a division or of a corps will march in rear of the leading battalion or regiment of the main-body of the advance-guard. The artillery of a division will march in rear of the leading regiment, or at the latest in rear of the leading brigade of the division. The corps-artillery will march in rear of the leading brigade of the main-body, or at the latest in rear of the leading division. The Horse artillery of a cavalry division will march in rear of the leading regiment of the main-body.

In retiring, the same rules will be followed, except of course that the troops will be supposed to have turned about.

V. The wishes which you utter with regard to the DRILL REGULATIONS may be expressed in one word—SIMPLICITY.

With this object all evolutions in the Instructions for mounted drill, which are not necessary for the object of artillery in war, ought to be abolished, in order thus to save time, which may be employed in practising carefully and exactly all the other instructions contained in the drill-regulations.

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[*] NOTE,—Of 6 battalions. N.L.W. | [†] NOTE.—Of 3 battalions. N.L.W.

RUSSIAN SUMMER MANŒUVRES AT KRASNOE-SELO CAMP IN 1887.

TRANSLATED FROM THE REVUE MILITAIR DE L'ETRANGER BY LIEUTENANT J. McD. BAIRD, DERBYSHIRE REGT.

(The following account of the last camp of exercise at Krasnoe-Sélo may prove of interest. The accompanying sketch map has been kindly copied for me from the French map by Sergeant H. W. Roberts, 2nd Battalion Derbyshire Regiment.)

Among the manœuvres arranged for the Russian army in 1887, those at Krasnoé-Sélo initiated for the benefit of the garrisons in and around St. Petersburg are of general interest. As the exercises were restricted to minor tactical operations, we propose to give in detail, some of the operations which took place in the course of these manœuvres, particularly during the week in which the Emperor attended the camp.

The troops assembled at Krasnoé-Sélo from the 15th May can be divided into three groups :—

(1.)—The Guard, comprising

8 Infantry Regiments of the 1st and 2nd Divisions.
The Rifle Brigade.
The Reserve Battalion of the Guard.
The 1st and 2nd Cavalry Divisions (less one brigade.)
The 1st and 2nd Field Artillery Brigades.
The Horse Artillery Brigade (less one battery.)

(2.)—The troop of the Line, viz :—

The 37th Infantry Division.
The 3rd and 4th Finland Rifle Battalions.
The 5th and 6th Reserve Battalions.
The 37th Artillery Brigade.
4 Batteries of the 23rd Artillery Brigade.

(3.)—Then the third class formed by the military Infantry, Cavalry and Artillery Schools; the Cavalry Officers' School and the School of Musketry.

The mass of the troops represented

62 Battalions
49 Squadrons.
136 Guns.

Their strength was 1,371 officers and 29,379 men.

The Guard was under canvas; the 37th Infantry Division and the Schools in barracks.

From the 15th May to 10th August, the out-door instruction, which had been interrupted by the severe winter at St. Petersburg was carried on, after which the usual summer programme was fulfilled, and the troops in the concluding week of the camp manœuvred under the eye of the Emperor, sometimes collectively, sometimes separately. The manœuvres as detailed hereafter alternated with the usual religious festivals.

GENERAL PROGRAMME.

11th August—Inspection of camp and grand retreat.
12th August—Grand review of the troops.
13th August—Blessing of the colours.
14th August—Races for officers.
15th August—*Morning*:—Small scale manœuvres of a force on war strength.
Evening:—Exercises for the 2nd Infantry Division of the guard; a detachment of Artillery and the Rifle Battalion of the Guard.
16th August—*Morning*:—Exercises for the 2nd Guard Cavalry Division, and the 2nd and 5th Horse Artillery batteries of the Guard.
Evening:—Exercise of the Military Schools. (A mixed battalion of scholars, a company of the Younker School at St. Petersburg, a squadron from the Nicholas Cavalry School, and a battery from the Michel Artillery School.)
17th August—*Morning*:—Exercise of the 37th Infantry Division, of two battalions of Finland Rifles, of two Reserve battalions; of the 37th Artillery brigade and of 4 batteries of the 23rd brigade.
Evening:—Exercise of a force of the three arms at field firing.
18th August—Parade of the Préobrajenski, and Samara (147th of line) regiments, and the Guard Artillery.
19th August—Army corps manœuvres.

Notwithstanding the absence of extensive manœeuvres (except on the last day,) the series of small varied exercises afforded ample opportunity for appreciating the bearing of the troops, and their degree of instruction.

In accordance with the programme, at 6 P. M., on the 11th August the Emperor inspected the camp. The troops of all arms were drawn up on foot in front of it, in full dress, with helmets, and without arms. The camp having been inspected, the Emperor accompanied by the Empress and a large suite placed himself facing the bands, massed for the Evening Prayer. At a given signal by a salvo from all the guns in camp, the bands played the national anthem, then a simple soldier, instructed so to do, came towards the Emperor, and recited in a clear voice the Evening Prayer. All the officers assisted at this imposing ceremony.

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* These races are an annual institution—obligatory for officers of Cavalry and Horse Artillery. The steeplechase course at Krasnoé-Sélo is 2¼ miles in circumference, and a prize of 4,000 Roubles (about £625 is awarded yearly.)

On Friday, August 12th, for the grand review on the Drill Ground, the three infantry divisions under the Grand Duke Vladimir, commanding the St. Petersburg district, were drawn up, one behind the other, in lines of battalion columns, with an interval of about 30 paces. Between the brigades of each division were the divisional artillery without wagons.—The Cavalry on the left of the infantry, in a line of regiments in close column. As the Emperor passed, he was welcomed with regulated cheers. The regiments of horse and dragoon Guards appeared in caps and dark tunics, without the helmet or cuirass, which is only worn at large parades in St. Petersburg.

The Infantry marched past at a brisk step, correctly, and with good cadence.

The Cavalry passed by squadrons at open distance: the Artillery by batteries, with an interval of six paces between the guns. The Artillery horses appeared excellent: the bay horses of the dragoons and the grey horses of the hussars are evidently the best, the trappings are of an old pattern, a new has been adopted and is in use in the cavalry schools.

Two infantry regiments carried for trial, two kinds of havresacks—one of cloth, with shoulder belt, and resting on the left buttock, it appeared to tire the soldier: the other carried on the back as of old, but longer and narrower, and resting on the loin.

The Rifle battalion of the Guard is trying a bandolier (hunting pattern,) worn on the breast diagonally from left to right, intended to accelerate loading.—It is said to favor rapidity of fire (13 shots per minute.)

On the 13th August, at midday, the imposing ceremony of blessing the colours took place. On the afternoon of the 14th, the obligatory race for officers was held, 60 officers from each brigade took part in it, principally captains and lieutenants. The obstacles comprised 4 hurdles, an "in and out," a water jump, and two hedges. Voluntary races followed this, officers only being allowed to compete, who rode chargers of their own arm of the service.

The morning of August 15th was devoted to minor operations of small bodies on a war footing.

One of these bodies, called the Ropcha force, was supposed to come from that direction (vide map): it was under the command of the Grand Duke Sergius Alexandrovitch, and comprised:—

1 Battalion Préobrajenski Regiment (together with a company of the Guard Reserve Battalion.)
2 Squadrons of the Ataman Cossack Regiment.
1 Battery of 4 guns of the 1st Artillery Brigade.

Its first position was on the Laboratory slopes, with an advanced Guard posted at the Tsarsky-Valik, and its patrols pushed on to the crest of the Karvelakhti. The intelligence possessed about the enemy was merely the fact that he was expected from Gatchina—the force had orders to drive him back on the Ijora.

The Gatchina force had as chief, Major General Pantélieïev and comprised:—

1 Battalion Séménovski Regiment.
4 Squadrons from the first Guard Cavalry Division.
4 Guns.

This force was sub-divided into two columns of route: one, the left consisted of 2 companies, 3 squadrons, and 2 guns on the old Gatchina road: the cavalry as an advanced Guard about Staritzy, the remainder at Golodoukhy.—The right column, strength 2 companies, 1 squadron, and 2 guns had its cavalry in advance, near Elisavetino, the main body one verst south of Grand Taitzy. The arrival of the enemy at Ropcha was known, and also the presence of his vedettes on the Karvelakhti crests. Its object was to contain the enemy, whilst an endeavour was made to seize the Karvelakhti crests.

This class of counter operations, frequently repeated in Russia, has for its aim, the exercise of superior officers in leading troops of all arms, and familiarising them with the amount of space occupied on the ground by units at war strength.

On the afternoon of the 15th, the 2nd Infantry Division of the Guard, under the command of its chief General Richter, carried out an offensive action against an enemy indicated by some flags. This force had its advanced guard at Tsarsky Valik, and the main body at Raskino. The successive development of the operation comprised the four following phases:—

(1) Offensive taken by the advance guard.
(2) Attack of the Ravine and the Advanced Guard Camp.*
(3) Occupation of a position behind this camp, and preparation for a final attack.
(4) Attack of the bridges (†) and pursuit.

On the 16th August, the cavalry took its turn of manœuvring before the Emperor. The 2nd Division of the guard executed a simple movement in which it had

(1) To form for attack, and assail the Karvelakhti crests.
(2) To change front towards the Polygon on the Drill Ground.
(3) To occupy the Laboratory and deliver a decisive charge.

On the same evening the mixed battalion from the Military Schools, the company of Younkers from St. Petersburg, the battery from the Michel School, and the Nicholas School squadron, assembled near Tsarsky Valik and executed the following exercises:—

(1) Assuming battle order.
(2) Preparation for a bayonet assault, and repelling cavalry charges.
(3) Occupation of the Advanced Guard camp and pursuit.

On the morning of the 17th August, the 37th Infantry Division, with the other troops mentioned in the general programme, executed in turn an operation against an indicated enemy. At first, they formed two bodies :—the one made an offensive march from Ropcha towards Krasnoe-Selo and Kheimozi: the other supposed to have come from Peterhof, occupied the line of heights which extend from Kapors Kaïa to Kameriaza. After a warm artillery fight, the Ropcha force delivered an assault against the line of heights, which was repulsed. The two portions of the 37th Infantry Division having reunited, took the offensive and surrounded the Rogolova redoubt where the Emperor stood. They carried the work and pursued the enemy towards the Drill Ground.

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* The Advanced Guard camp is that portion of Krasnoe-Selo camp to the west of Lake Douderhof—the other is the Grand Camp.

† Those leading from the Advanced Guard camp to Grand camp across Lake Douderhof.

The afternoon of this day was devoted to the most interesting exercise of the series, namely, the execution of field firing by a force of the three arms. A plan strictly regulated in advance governs the exercise—the troops of each arm assume successively fighting and marching formations, following appointed lines so as to fire on the targets which mark the progressive phases of the action, and which are sufficient in number for each arm. The operation concluded the hits are taken off and a percentage struck.

Tuesday, August 18th, was entirely devoted to the religious and military festival of the Preobrajenski and Samara Regiments, and the Guard Artillery.

Friday, the 19th, the final day, was set apart for the Grand Manœuvres, in which two army corps opposed each other.

The Southern corps was placed under the command of Lieutenant-General Prince Chakovskoi, who had Colonel Stavrovski as his chief of the staff. It comprised

2 Infantry Divisions of the Guard.
1 Cavalry Division.
1st and 2nd Artillery Brigades.
3 Batteries of Horse Artillery.

or a total of :—

32 Battalions.
23 Squadrons.
68 Guns.

Original position.—The main body of the Infantry and Field Artillery massed near Alexandrovskoi and Kouprianova, with an advanced guard of the three arms at Douderhof and Kirchof.—The bulk of the Cavalry at Gargina, its advanced guard at Kavelakhti.

Information about the enemy.—He has bivouacked at Sosnovka, Gorielovo, Konstantinovskaïa: his advanced parties occupy Kagrassa and Nikoulina—Kranoé-Sélo is protected by entrenchments, and is believed to be held by a strong advanced guard. The *object* of the Army corps is to attack Kagrassa heights.

The Northern corps was commanded by Lieutenant-General Gelfreich, who had Colonel Skougarevski, as his chief of the staff. It consisted of :—

The Schools.
The 37th Infantry Division.
A Squadron from the Cavalry officers' School.

The 2nd Guard Cavalry Division.
The 23rd and 37th Artillery Brigades.
The Field and Horse Batteries of the Artillery School.

a total of—

27 Battalions.
26 Squadrons.
70 Guns.

Original position.—The main body north of Nikouliua and Kargrassa, the advanced guard near the villages.—The bulk of the Cavalry in order of march in the streets of Krasnoé, the leading party being at the entrance to the village from the Drill-Ground.

Information of the enemy.—He is known to occupy Douderhof and Kirchof in force: his Cavalry and Horse Artillery are reported on the Kavelakhti crest, near the old Gatchina road·

The Northern corps at Krasnoé-Sélo, covering the concentration of the army on St. Petersburg, determined to attack Douderhof and Kirchof, at the same time the Cavalry is directed towards Kavelakhti, on the left flank of the enemy.

This then is a summary of the manœuvres executed in 1887, by the troops stationed at Krasnoé-Sélo, on the conclusion of their summer drills.—In default of the criticisms of a competant observer, on the operations, we have the remarks made by the commander of the troops to fall back on, and these dwell upon the faults which have been noticed; each year, in fact, the Grand Duke Vladimir, at the end of the manœuvres, summarises the criticisms made. They are published in an order, which becomes a guide for the conduct of the instruction in the following year. The text of the recommendations formulated in 1887, by the Grand Duke Vladimir, whilst revealing the mistakes noticed, show the care taken in the Russian army in the preparation of troops for war. They are to this effect.

(1) In general, orders are to be distinguished by correctness and clearness. At times, troops are directed to "await a new order" in situations and circumstances when their *rôle* cannot be precisely laid down. A similar order to the above mentioned one, has kept troops in positions they occupy, when the phases of a battle show them plainly the necessity for moving. Again, certain orders enter too much into detail and point out, for instance, the exact spot where an attack formation should be assumed. Such specific orders hamper the movement of subordinates, and are useless; a person on the spot is the best judge of the right place and moment for action.

(2) The manœuvres have discovered the habit of certain leaders to split up, unnecessarily, their troops into several columns, which are separately presented to the enemy and so are liable to be beaten in detail. Unity of action is so essential a principle, that it must never when possible be neglected.

(3) Marches have been made regularly. However, night marches have shown insufficient cohesion, too great a lengthening out of the troops compatible with safety, and at times a want of silence in the ranks. They do not admit of movements on a large scale, which have

for their object, the development of the mobility of troops, but are intended rather to procure manœuvring advantages, by seizing on important points. Such movements fatigue the men, impair their health, and interfere with the regularity of the manœuvre.

(4) In passing from marching to fighting formation, many leaders have commenced by deploying their Infantry, and have only employed their Artillery, after the Infantry had begun the engagement, thus curtailing the time requisite for the preparation of the attack, and ignoring reconnaissance.

(5) It has frequently happened, that detachments have taken up too extended a front for action, especially, when, on the preceding march, they have been split up into several columns.

(6) Great progress has been made in the leading of troops during the manœuvres, but as progress is their object, every attention must be devoted towards attaining the perfection, of which exercises of the three arms are capable. In reference to this, it has been remarked, that commanders of integral portions, such as the advanced and rear guards, or main body, in entering upon an action, wait for orders when they cannot receive them, and sometimes have not done what circumstances dictated to them, surrendering the initiative, which is of such primary importance to every commander.

In the combined action of Infantry, or of Cavalry with Artillery the commanders of the two arms first named, fail to indicate to the Artillery, the place where it should take post, and the point on which its fire should be directed. When artillery enters into the composition of a detachment, its commander should always furnish the necessary instructions, in accordance with which, this arm can fully co-operate in the action of the others. In battle, a commander, after having appreciated the existing state of affairs, should determine the moment for a general attack or for counter attack. Insufficient directions on the part of a commander explains why, in certain cases, the defence has not been determined enough, why the offensive was not taken when it seemed necessary, why again, in the execution of the attack on an important point, sufficient force has not been concentrated, or why certain troops have been led across the open without profiting by cover.

The faults displayed in the general leading of bodies of men are usually attributable to the want of cohesion between them, and to the want of information about the enemy. Experience has shown that cavalry furnishes early and accurate news, that it acts with daring and intelligence, but only when reconnaissance is well organized, and that a precise mission has been entrusted to it. But, when cavalry parties set out with vaguely worded orders, such as "to discover the movements and intentions of the enemy, to reconnoitre the enemy, to keep touch of him," the results of their action depend alone on the manner in which the leader appreciates the duty imposed on him. It is therefore very necessary, that a commander should explain to cavalry officers, the present situation of the force, his information of the enemy, the plan he proposes to carry into execution, the possible and probable means of action in the hands of the enemy, and the object of the reconnaissance. Furnished with these instructions, the cavalry officer will keep his eyes open and he can then receive well merited reproof if he does not fulfil his part.

In what concerns each branch, attention is directed to the following points :—In the Infantry, to the importance of seeking cover, to a better preparation by fire-action, and the employment of reserves in the attack and to its execution by combined and decisive shock-action. The regulations for the conduct of the attack have not always been observed.

In the cavalry, in action contact is lost, the flanks insufficiently protected, the enemy's flanks neglected, and the necessity for information disregarded.

It will be remarked in the preceding criticisms, the importance attached to combined manœuvres of the three arms. These class of exercises have been in vogue in the Russian army for the past three years only. It is not astonishing then that perfection has not yet been attained, and that the Grand Duke Vladimir insists particularly on care in the performance of manœuvres, which he rightly considers as the best war-school for officers of every branch of the service.

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It will be remarked in the preceding criticisms, the [illegible] attached to combined manœuvres of the three arms. These exercises have been in vogue in the Russian army for the [illegible] years only. It is not astonishing then that perfection has not [illegible] attained, and that the Grand Duke Vladimir insists particularly [illegible] care in the performance of manœuvres, which he rightly considers the best war school for officers of every branch of the service.

NOTE ON THE FRAMING OF MILITARY ORDERS.

A pamplet entitled "Views on the framing of orders in the Field, at Manœuves and in a War Game" by Captain Norman Bray 2nd Royal Inniskilling Fusiliers has been just received by the U. S. I. of India and is well worthy of being read and taken to heart by all officers, more especially those on the staff who have daily to frame orders. Captain Bray points out that it is only by "the magic word Decentralization" that the orders issued by those high (in authority can be minimized. In the German Army "Decentralization" has been brought to a greater pitch of perfection than in any other and as instances of the extent to which it can be carried he quotes :—

(I) The orders issued by the Crown Prince to the Army for the march preceding the Battle of Weissenburg.

(II) Von Werders dispositions for the battle Lisaine which only occupy ¾ of a page.

Most officers will agree with us in thinking that in our service we have made but little advance towards "Decentralization." From the Government down to the Officer Commanding a Regiment there is still great room for improvement. During the past 2 years however every effort has been made at Army Head Quarters to attain this desirable end and to place greater powers in the hands of General Officers Commanding. The first step towards Decentralization is to foster a spirit of independence and fearlessness of responsibility and this can only be done by entrusting all officers down the military ladder with greater powers. The meaning of the above cannot be better pointed than by referring to the late (or rather still existing) Burmah campaign which has been essentially a junior officers campaign in which great responsibility has been time after time thrown on subaltern officers and native officers and, almost without exception, they have acquitted themselves not only creditably, but often in the most distinguished manner; the value of this experience to the junior officers who have taken part in the campaign cannot be over-estimated. Some of our readers may say, "But what on earth has this got to do with the length of orders? and we reply "everything." Tho only thing that makes short orders possible is perfect reliance in the ability of your subordinates to carry out the spirit of orders in accordance with the circumstances of the moment unfettered by a mass of detailed instructions. Such detailed instructions are generally based on one fixed idea in the mind of the issuer of the orders and if actual occurrences do not exactly follow this idea the details are not only utterly useless but confusing. The staff officer who issues long winded orders is generally a person extremely conscious of his own superior merit and of the vast inferiority of all those to whom he has to interpret the orders of his General; in pity for their ignorance and incapacity he therefore considers it necessary to give them detailed orders for every possible contingency.

In our service however the system of detailing orders in the letter, instead of leaving subordinates to carry them out in their spirit, has to a certain extent grown up from two main causes.

(I) The inefficiency of many officers for the positions which they have held whether as Generals Commanding Divisions or Brigades, or Officers Commanding Regiments, Squadrons, Batteries, or Companies.

(II) The fact that no larger units of organisation have existed than the Regiment and Battery.

With regard to the first point a very great change is being gradually worked on the face of the Army and the principle of selection tempered by seniority cannot but fail to benefit its efficiency. It is difficult to imagine that we shall again see the sad effects of combined senility and inefficiency from which we suffered at the commencement of the Mutiny.

The second point noted is no doubt the great cause for long orders in our campaigns and the reason is that, on a force being concentrated for the field it often happens that the General Officer Commanding and his staff have no personal knowledge of the Officers Commanding units, and consequently there is not that feeling of trust on the one side and confidence on the other which can only be engendered by personal intercourse. In the German Army all this is different, the General who commands an Army Corps knows his Divisional Generals intimately and has inspected their commands in peace time, and so on down the chain of responsibility, each commander knows that his subordinates are "good men and true" and, if they are not, it is his own fault. Self reliance in subordinates is fostered by the knowledge that they are thoroughly trusted by their commander, they get to know his ways and his little failings or idiosyncrasies, if he has any, (and who has not) and they understand and make allowances for them.

Thus any friction which might exist is got over in peace time and a thorough understanding exists amongst all ranks.

With us friction often arises when a force is brought together, harmony is conspicuous by its absence and mutual confidence between the commander and the commanded is destroyed. This all tends to prevent subordinates seizing the spirit of the intention of their commander and loyally and thoroughly carrying them out.

To have perfect "decentralization" we must have no damaged link in the chain of responsibility; that is all Officers from General Commanding down to the Company or Troop Officers must be fit for their position or else there is a hitch, the strain tells on the damaged link and it fails at the critical moment with the result that the intentions of the commander may be shipwecked. We cannot of course hope to attain to perfection in a few months, it will take years of patient application of the system; and even then the most perfect system is of course fallible.

We would especially point to the evils of long orders in the field. The General of an Army Corps issues 4 or 5 pages of orders for the next day, these probably cannot be issued until late in the afternoon, even if they are printed and sent to divisions and have not to be copied by clerks. On receipt by Divisions the orders for the next day have to be framed and copied by Brigades, the same procedure is followed by Brigades and at last orders filter down to the Company orderly, but often not till past midnight. It will be at once patent to any one who has had to frame orders, on those issued by a superior, what an amount of time will be lost supposing the Army Corps orders contain much detail. In framing subordinate orders these details have to be followed and fresh details given, whereas if the orders are only very general the matter is an easy one. In our camps of exercise the late hour at which orders reach units has always been a great source of complaint and this must be largely attributable to the system of trying to impress the letter and not the spirit of orders on subordinates. There is no better sign of a good staff than short orders which reach the units by an early hour, wherever this is possible. We would earnestly ask all those who may read this short note to ponder on what may at first seem a matter of little importance, but the love of writing has reached great lengths in our service and in the administration generally, and correspondence and voluminous reports are increasing annually. In War despatches, orders to the Army, in Administration Reports of Local Governments, Sanitary or other Reports the whole tendency is to cover a very large amount of paper, which defeats the very intention of the document and results in few thoroughly digesting the matter written. People, as a rule, are slow to grasp the fact that a military order or a report of any kind, which is precise and to the point is evidence of much more careful thought and ability, and is much more difficult to write than one which is burdened with detail or which contains a quantity of what is known as "padding" or extraneous matter, such as extracts from books, other reports &c.

To attain to a thorough system of decentralization we must begin at the top, that is with the Government Offices, and we cannot help thinking that we in the Army are behind our brethren in civil departments in this respect. The organisation and peculiar condition of our Army in India render any attempt to arrive at the pitch of "decentralisation" attained in Germany impossible, but still much might be done and the benefit to all ranks of the army would be inestimable.

We would conclude with one word of advice (after Punch) to Staff Officers who are given to writing long orders.

"Do'nt."

E. R. E.

ENGLAND'S PRESENT MILITARY POSITION.*

Translated from the German by CAPTAIN L. W. BODÉ,
D. C. O. *Middlesex Regiment.*

Albion, the ruler of the seas, has in consequence of her insular position, her commercial interests, and her policy of non-intervention in the quarrels of her continental neighbours, a policy adhered to for more than thirty years, been in the enviable position of avoiding the expenditure of much money and material of every kind on her armed forces. This has gone to increase her national prosperity.

Considering the present enormous increase in standing armies and general warlike preparations, England now finds herself in a state of defencelessness—in the event of her having to go to war with an adversary her equal in power—which has aroused public opinion in England.

Many writings have been published on this subject on both sides of the channel. It may therefore be of interest to ascertain the present condition and requirements of the British military forces, more particularly as a distinct tendency is at this moment noticeable in that country to insist on a reorganisation of these forces.

In the following pages it is intended to review this condition and these requirements, and, in doing so, particular attention will be paid to the most important of the writings referred to above, namely those by Sir Charles Dilke.

A great number of the inhabitants of England live in the hope, that the enormous wealth of the state and the courage of the nation will protect them from dangers which their common sense tells them do in reality exist. But a still greater number of the educated English are persuaded that an invasion of England is a conceivable possibility, that England is not sufficiently protected against such an invasion, and that it would be followed by most dire consequences for the public weal. It is not denied, that the occupation of even London alone would mean the conquest of Great Britain; that further, the slackening of the bands that unite the various parts of the empire, the loss of the coaling stations and the destruction of Englands international commerce, the payment of enormous warcosts, and the discontent at home consequent on the enormously increased taxation resulting therefrom, would lead to the end of the Empire as at present constituted.

Not taking into consideration at all the case that England may be called upon to resist a coalition of several Great Powers such as *e. g.* France and Italy, or France and the United States, well informed persons on the other side of the Channel are of opinion that England, at

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"Die heutige Militarische situation Englands," by R. v B. Streffleur's Osterreichsche Militarische Zeitschrift. April-Mai, 1888.

the present moment, is not even in a position to engage with success France alone; for although the English fleet is doubtlessly still stronger than the French in an absolute sense, it is doubtful whether it is still so relatively, *i. e.* if one takes into consideration the various urgent duties it will be called upon to perform. For in consequence of the weakness of the military forces the English fleet will be called upon, in the event of war, to perform duties which really do not lie within the sphere of a fleet's action.

It we are to take Herr von Bunsen's warning in his "a German view of Gladstone" literally, England has something more to fear than a war with Russia or with France. It is known to those who can look behind the scenes of Eastern Politics, that, after the ratification of the Anglo-Turkish convention with regard to Egypt had been refused, Germany urged England to take a more active part in Eastern affairs, holding out a prospect of support from Austria and Italy, but that Lord Salisbury, perhaps with reason, refused to do this to Bismarck's intense annoyance; upon which in August last the lines of Austrian and German policy diverged, the latter inclining with regard to Bulgaria towards Russia's views. This fact lends weight to Herr von Bunsen's words in which he warns England that, if she neglects Bulgaria and leaves it to Europe to look after that State, she will compel her natural friends and allies to protect themselves by sacrificing Bulgaria, and that it will yet be many years before Australia will be strong enough to save the United Kingdom or India from a Franco-Russian invasion.

Under her present military system, which is in reality a purely defensive one, England can only dispose of two army corps to form an Expeditionary Force beyond her own shores. The Volunteer Force and the Indian Troops are not fitted to take the field against trained European armies.

England is therefore hardly in a position to protect Turkey against Russia, just as unable to protect Belgium against Germany or France, or, in the event of a possible war with Russia, to execute a counter-attack in the Caucasus, an operation which many Englishmen are in favor of.

England is notoriously unready for war, and, in consequence of her inability to actively assert herself, great dangers arise not alone to British commerce but to the peace of Europe. It is certainly more than probable that some arrangement will be come to meanwhile between England and Russia because the present condition of the Russian Asiatic railway system renders it impossible for Russia, at this moment, to attack India under as favourable conditions as later; consequently a delay is advantageous to Russia.

With regard to Belgium and Constantinople such a change has taken place in English public opinion since 1870-71 that the nation is no longer inclined to undertake the defence of the two places. But the more enlightened classes of English Society are not blind to the fact that, even supposing the defence of Constantinople and Belgium to be given up, a policy of disarmament could not be adopted without grave dangers in the future. The defence of India must be taken into consideration, as well as that of the English coaling stations and England's international commerce, and in the event of war there is a certain danger of an invasion of the British Isles; and further, what would be worse still, the possible paralysing of the forces of the Empire through panic.

In the beginning of this year, when war between France and Germany appeared probable, the despatch of a Corps of Observation to Belgium was taken into consideration in British official circles; it soon however, became obvious that the Government would not be able to carry through such a measure; it appears therefore to be highly improbable that England will ever fight for Belgium.

England with an annual expenditure of £40,000,000 on her Imperial Army at home, in India and in the Colonies, therefore attains this—that she may possibly be able to put into the field a force equal in strength to the army of Roumania. The British forces in India are only just sufficient to garrison the country, leaving no troops available for operations beyond the frontier; it would be difficult for her to oppose a Russian invasion especially if accompanied by local risings in India, instigated by Russia. The Afghans may side with Russia, and the British native troops turn against their masters should their faith in them be shaken by the approach of the army of a Great Power.

The populations of Herat and Afghan-Turkistan may hail the Russians as their deliverers from the Afghan yoke, and the Native States of India, won over by Russian intrigue, may rise against the British in rear.

Recently Ayub Khan escaped from Teheran, where he was held captive. It is, however, always assumed in England that the Russians will make use of him whenever it appears to their advantage to do so.

With regard to Germany is it feared in England that the approach of the rule of Crown Prince William as German Emperor forbodes war. Crown Prince William is regarded as belonging to the Junker warparty, who will, as soon as he ascends the throne, attack France and possibly spread the terrors of a general war over Europe. On this account the restoration to health of the present Emperor is earnestly wished.

With regard to Belgium it should be stated that there is a party in England who hold that this country should be defended by England, and, that as the army is at present insufficient to do so, a reconstitution of the English military forces is rendered all the more necessary. The opinion is generally entertained in England that alliances are not to be counted on, and the nation is therefore endeavouring to see clearly whether Turkey and the neutrality of Belgium should be defended and whether Egypt should be held against France· There is general unanimity, naturally, as to the necessity of defending the United Kingdom, the isolated and smaller colonies, and finally the coaling stations. The question as to the possibility of England's being able to defend India against Russia, without executing a counter attack, is being ventilated; and the possibility, in the event of a war with France, of executing such a counter attack in Tonkin, Tunis or Corsica is also being discussed.

Powerful voices are making themselves heard that neither Army nor Navy are in a condition to defend the British Empire or its commerce and that therefore not alone the Army but the Navy also must be increased, that the British fortresses and the fortifications of the coaling stations must be completed and armed.

The whole discussion with regard to the military topics of the day is carried on in England with a "sans gêne" and publicity, even when touching on points revealing weaknesses in the British military system which have hitherto remained concealed, only possible or apparently advisable in a country "au fond" so republican, to give the necessary impulse to public opinion to enable a measure to be carried through Parliament. Occasionally one comes across startling misconceptions with regard to military matters similar to that of 1866, when it was the firm and universal belief of English military men that Austria would beat Prussia in Bohemia, or that of 1878 when most of them inclined to the belief that the Turks would drive back the Russians into the Danube. In the fore-ground of the discussion, however, ever remains the question of the war with Russia which must come sooner or later, with regard to which, even assuming Turkey to be an ally, the very obvious conclusion has been come to—that England will be unable to hold Asia Minor against Russia.

With regard to the actual nature and composition of the British forces the first thing wanting is a sufficient field artillery for home defence, and by persons competent to judge 900 Field-guns are said to be the number necessary for the defence of England, based on the fact that 138 field-guns are attached to each army corps in France (with the exception of the Corps of Algiers), and that the recently mobilised French army corps were in a position, five days after receipt of the order for mobilization, to march out each with 102 guns fully horsed and equipped for war. Foreign artilleries are less expensive than the English, and perhaps only to a very small degree less efficient. And yet, at the present moment, marvellous to relate, in spite of the great numerical superiority of the foreign field artilleries that have to be taken into account, England is on the eve of reducing her field artillery, at least the very flower of it, her Horse Artillery, and is at this moment really dependent on the artillery of her Auxiliary Forces, of which even her own soldiers have but a poor opinion. The Volunteer Artillery has many defects,—it is wanting in mobility and no arrangements have been made to supply the guns with draft horses in the event of war.

Many people in England are of opinion that these guns would be most profitably employed as guns of position under scientifically trained officers.

The Horse Artillery was recently reduced in England, the number of artillery officers lessened and now it is found that there soon will be a greater scarcity than ever of trained Artillery officers capable of taking over the heavy guns of the volunteer artillery, supposing these are ever supplied, and who are experienced in the fire management of such heavy guns. In the wars of the future the introductory engagements will consist of combats between cavalry supported by horse artillery and an opposing cavalry similarly supported; as the training of these two arms requires a certain time one is inclined in England to consider British cavalry and artillery superior to those of continental armies whose men serve only a short time. The English attach too much importance to their certainly magnificent horse artillery, and quite forget, in their assumption of superiority over other nations in this respect, the inconceivably small effect of this arm on a battle field where several 100,000 men are struggling against one another. In consequence of the often unimposing appearance of foreign artillery and cavalry Englishmen are apt to underestimate their efficiency. Some clear sighted persons warn against this, however; and some have even gone so far as to declare the English horse artillery, brilliant also through their dress, to be nothing more than a plaything, and are anxious to reduce it; a reduction which in many military circles is regarded as a great mistake, and against which the case of Italy is cited, which, in spite of its limited means, has considerably augmented its horse artillery. With regard to its field artillery England is therefore, without doubt, far behind the continent, as it maintains permanently a force of artillery equal approximately to that of each French army corps. Great importance is attached in the British army to the smart dress of the soldier, if only for the sake of encouraging recruiting, now, however, there are some inclined in place of this to see the condition of the private soldier improved, though they do not go as far as the Russians who tried to abolish metal buttons and scabbards in their army.

The volunteer field artillery is intended to take the place of the regular artillery in the defence of Great Britain, as the latter is to be used for expeditionary purposes. Herein lies a great danger for it is not nearly equal to the regular artillery in point of efficiency and because England,'at the time of invasion, will be entirely denuded, of all regular field artillery and will have to oppose the enemy with her very poorly trained Militia and Volunteer Army, which, in place of being able to find a support in a strong efficient field artillery, capable of making up for its own want of training, will have to take the field against the enemy with an insufficiently trained and even numerically not very strong force of that arm.

The official opinion, shared by a great part of the country is this (most surprising to an inhabitant of the continent), viz :—that the nation cannot demand and is too poor (!) to place a single gun belonging to the regular artillery in the field to oppose foreign invasion. The present Artillery Reserve is in reality only sufficient to raise the present Royal Batteries of Artillery to a war footing for foreign service. There is no reserve of horses, although an attempt is being made to form one.

England has a sufficient number of batteries for two army corps and 14 batteries in addition, which, however, would be turned into ammunition columns. Some few doubt, even, if there are sufficient trained men and horses to raise the batteries for the two army corps to their warfooting. It has further become a settled principle that in the event of invasion the defence will be conducted by the Volunteers and such Regiments of Militia as may be left after Malta and Gibraltar have been supplied with the necessary battalions and certain other garrisons have in addition been furnished; and that, further, the presence of any regular troops to support the Volunteers, or of the remainder of the Militia would be purely a matter of "chance."

It is an established fact that in a Militia and Volunteer army, which in addition would probably have to contend with an enemy armed with a superior rifle, the proportion of artillery should be greater than in a regular army, and it is also a fact, that, although England ought to have 900 field guns, or even a greater number, as her troops are only half trained and badly armed, as affairs stand at present, she has not a single gun for the volunteer field batteries are not yet formed.

The most eager advocate for the formation of volunteer field batteries on a large scale, to obviate this defect, (which is acknowledged to be the weakest point in the whole English system of defence) admits that a special volunteer artillery cannot be formed if the men are not paid.

An Englishman, Captain Thompson, asks for a Militia field artillery and the hope is entertained that such an artillery may be formed, and that it will be equal to the present French field artillery; on the assumption, however, that the men, who will for the most part do permanent duty with the battery, are to receive pay. Colonel Richardson, as well as Colonel Ray, admit that, owing to the position of the volunteers, permanent unpaid batteries could only be maintained in certain specially wealthy districts or if consisting of wealthy persons. General Brackenbury explains in a report that the whole of the Militia Artillery will be used for the defence of fortified places and that the greater part of the Volunteer Artillery will be required for the same purpose.

Thus it is admitted on many sides that England has no field artillery available for defence, that the nucleus of such an artillery does not even exist, and that during many years, while England has constantly been making preparations against attack, this most important point of all has been left totally unconsidered.

A well known and distinguished British officer, General Brackenbury, in a lecture recently delivered in the Royal United Service Institution was authorised to explain the views of the Intelligence Department. On this occasion he stated that in the event of war there would be available for the defence of England possibly a small force of regular infantry, certainly a strong force of Militia, but no field artillery at all. He calculated that for the defence of Great Britain alone 390 field guns would be necessary, in the proportion of three guns to every 1000 men of the 130,000 available. Many, and with reason, consider this proportian too small for half trained and badly armed men as in foreign armies there are 3 to 4 guns to every 1,000 men.

The cheapness of volunteer artillery induced General Brackenbury to agree with Lord Wolseley in favour of a strong force of this nature. In the debate which took place in the House of Lords, on this part of General Brackenbury's lecture, Lord Wolseley drew attention to the excellence of the American artillery during the civil war only a year after it had been improvised from among the civil population. He apparently forgot, however, that on either side the American artillery was only opposed to a similar artillery, and that in the event of an invasion of England the English volunteers will have to oppose the flower of the artillery of some great foreign army.

Even in the newest and most recent works on the British Army there exist errors; these nearly all put down, in accordance with Gathorne-Hardy's miscarried scheme of 8 Army Corps, 90 guns for each of these Army Corps; but these 720 guns have never existed. Yet this scheme appeared for years in the official plan of mobilization.

In the event of a Russian attack on India England can in no way reckon on the thoroughly untrustworthy troops of the Native States; and the English would prefer to take every rifle and every cartridge from the 350,000 men forming the armies of the Native Princes, to allowing them to fight by their side against Russia. During the Afghan war at the action of Maiwand such a panic seized two Bombay Regiments that British Troops were obliged to full back before undisciplined detachments of Afghans. Numerous marauders belonging to her own native allies threatened the English communications and attacked posts in districts the population of which appeared to have assented to the British Rule, and in which for many years no disturbance of any kind had taken place.

Should the war with Russia, as is considered probable, be carried on without allies, Vladivostock in Russian Asia is considered the only point against which the English could deliver a counterstroke, the only point where Russia is vulnerable by England and this only for a few years more till Russia's Siberian Railway is ready.

Only Russia and France are regarded in England as likely enemies, as Germany has no interests likely to clash with England's, and because Germany is perfectly invulnerable by England. even supposing her territories in New Guinea and Africa were taken away, as these represent absolutely no value at present.

With regard to Italy there is no reason why differences should arise with England; but should they arise England's operations would be naval; and the task would devolve on her fleet of taking Sardinia and Sicily from the Kingdom of Italy; though this would be difficult matter when opposed to Italian armour clads of the first class and torpedo boats, if the British fleet is to carry out its other duties satisfactorily at the same time. A war with Austria is not believed in either in England. On the other hand many think that England will some day have to defend the neutrality of Belgium in a continental war against Germany with France and Belgium as allies; though the majority of the British Nation is not inclined to fight for the defence of Belgium, amongst others political leaders such as Lord Randolph Churchill and leading papers such as the *Standard* and *Morning Post*. The defence of Turkey against Russia seems the most natural and suitable field for the defence of British interests, yet Lord Salisbury, as has already been stated, turned a deaf ear last summer to Prince Bismarck's hints on this point.

The actual dangers of military operations on a large scale which England will have to face come from Russia and from France. It is possible that a French Government friendly disposed towards Germany, as *e. g.* Ferry's was, which took its policy from Berlin, may be in a position to ensure the neutrality of Germany in the event of a French war with England. What is much more likely to occur, however, is an isolated war between Russia and England, France maintaining an attitude of hostile neutrality towards England.

Now there are many Englishmen who will not hear of any increase in the expenditure on the armed forces, who are, on the contrary, of opinion that the military budget may be considerably curtailed if England holds aloof from continental politics. This opinion is very general in England at present; strongly upheld by the provincial press and supported by colonial interests; it appears to be growing into the settled policy of the English Democratic faction.

This opinion was represented even in the special committee assembled recently to consider the British Army Estimates and constantly finds expression in the speeches of men who have a considerable following in the House of Commons and the country generally. These men are of opinion that as far as the defence of Great Britain itself is concerned England may depend entirely on her fleet. But the more thoughtful section of the nation is beginning to see that England, even with an increased naval expenditure, will not be able at all times to maintain in the channel a fleet superior to that which France can without difficulty collect there. This would, indeed, be possible were England to give up her position in the Mediterranean; but without a war the English nation is not inclined to do this. The late General Gordon was a supporter of the idea that the Mediterranean ought to be given up; but other authorities such as *e. g.* Sir Samuel Baker, say that both roads to India are essential to England, and must be secured. England must hold the Suez canal, maintain a footing in Egypt and keep possession of her Mediterranean fortresses. England can only adopt this policy, however, if her forces are sufficiently strong. The present policy which has tended to weaken the army without strengthening the navy will probably result in this—that in the event of a war with France England would lose Egypt, but in the event of a war with Russia would keep it.

The British Public is not inclined to give up either Malta or Gibraltar, and both, if properly armed, are easy to hold.

The chance of having Italy as an ally in a coming war, and the strength of the Italian fleet render it possible that England may be able to hold her own in the Mediterranean against France, even should she, at the same time, have to defend her coaling stations and protect her commerce. And it is certain that, in spite of the radicals, England will endeavour to maintain her supremacy in the Mediterranean and the Suez Canal as long as a large number of competent persons are of opinion that this supremacy is necessary. On the other hand it is known that neither Malta nor Gibraltar are sufficiently strong at present, and that Cyprus is entirely without defence. The condition of Gibraltar is indeed miserable. The defects in the British defences are known in England, but till now it has been impossible to arouse public interest sufficiently to obtain the funds necessary for their rectification.

The report of General Anderson has shewn that the rifle with which the British troops are armed will soon be obsolete; that the Regular

Forces and the Navy must at the same time be armed with a repeating rifle, which will cost nearly £1,000,000 sterling. The Militia and Volunteers would, in the event of a war, be armed with an antiquated weapon, and would be called upon to resist regular troops armed with repeating rifles; further the Regular and Auxiliary forces would be armed with rifles and carbines taking different ammunition. Adhering to the axiom that for every rifle in the hands of the troops there should be one in reserve, the re-armament of the forces would cost £3,000,000. Another £1,500,000 is necessary for the defences of England's warharbours, i.e. the fortresses on the South coast, the Channel Islands, Malta, Gibraltar, Halifax and the Bermudas, and another million for the ports of commerce. The last few Governments have declined to take into consideration this expenditure of 5½ million, and experience alone will shew its necessity. It is, therefore, almost certain that in her next war England's Mediterranean fortresses will be in the same condition of hopeless defencelessness that characterizes them now; a circumstance that will materially add to the great difficulty of maintaining communications through the Suez Canal.

Let us take into consideration an extreme case and assume that England were to give up Constantinople, renounce all claim to Egypt, give up the idea of asserting her supremacy over the Suez Canal, leave Belgium and Turkey to their fate, and declare that, should she become involved in hostilities with any country, she would confine herself to the defensive,—even then it would not do to take for granted that she could blockade the French in their harbours if she does nothing for her fleet, even were she to cause it to neglect its other duties i.e. the defence of her coaling stations, her commerce and her minor colonial possessions.

But this policy would not obviate the danger of a war with Russia. There are many politicians in England who talk of an agreement with Russia, and seem to think that Russia does not desire any of England's possessions. These politicians argue that the defence of India is impossible without the co-operation of the Indian races, and, that if these heartily co-operate, a Russian invasion would become an impossibility. But India is not a single state, it is a great country inhabited by a great number of nations and peoples in all stages of civilization, of which some are completely satisfied with English rule, some ignorant and indifferent, some friendly disposed, but all inclined to go to war one with the other. On India borders China with which England carries on an immense trade, the loss of which would be a dreadful blow to her national prosperity. On England devolves the obligatory task of defending her Indian possessions and her commerce with China. The enormous extent of the Russian Empire, the patriotism and daring of her people, their intelligence and activity render them formidable adversaries on both these points.

But even were England to sacrifice Turkey, Belgium and Egypt and keep herself as free as possible from continental complications, she would, in the event of a war with Russia or France, depending alone on her Navy, her Volunteers and her weak Regular Forces be unable at the present moment to defend India or execute a counter-attack in any other part of the would. To enable England's military forces to respond to even the most modest calls, it is necessary that the English Navy should be supported in her task of home defence by fortifications, that a suitable organisation for the Volunteers should be adopted, that they should be supplied with artillery and the other necessary departmental branches of an organised army, which alone would enable this force to hinder a complete paralysis of the maritime power.

The probable causes which may involve England in a war, quite apart from the points of difference with Russia, lie scattered all over the world. The closing of certain branches of commerce on the Chinese coast, —such as that caused by France in the paper trade a few years ago, and which might easily occur again—is one of these; further French intrigues in Siam. In Newfoundland a rising against the Mother country, or a war with France might occur at any moment. Not very long ago England gave way in the New Guinea question in a manner which at present would no longer be tolerated, and which brought about Lord Derby's fall. England gave in to Germany on the Zanzibar question and lost her influence thereby, which always was the greatest, in a way that prejudicially influenced her trade. A war between England and the United States is further by no means out of the question.

Many people say that England's task would be an easy one, if it were confined to the defence of her possessions. But this defence includes many operations under most varying conditions. No one in England for instance doubts that the Channel Islands would have to be defended. But it would be by no means easy, even with a superiority in the matter of ships in the Channel, to defend these Islands and England's South coast.

With regard to the Russian situation the view was recently expressed in an English Military Journal that Russia, owing to her financial condition, could not go to war; it was left unnoticed, however, that during the last 20 years Russia has doubled her national income and doubled her taxes, and also her military expenditure and that yet she is much more prosperous than she was 20 years ago. The decision of Russia at that very time to commence the construction of her Trans-Siberian Railway is in singular contrast with this assertion. This is the most costly task yet undertaken by any power; its completion will render Russia invulnerable as far as England is concerned.

Recently symptoms have been observable in France which have indicated to England the possibility that France will some day, either with or without a Russian alliance, endeavour to compensate herself for the loss of Alsace by turning her attention, first to Siam, and then to China; in the hope of founding in those countries an Indian Empire more wonderful even than that of Britain. Voices have also been heard in France suggesting that Alsace should some day be regained by an exchange which would be to England's disadvantage. An anti-English policy would be popular in France, where Englishmen are even less liked than Germans.

A short time ago an ably written pamphlet appeared in Paris from the pen of a French officer, entitled. "England in the Mediterranean;"

and in this pamphlet a patriotic Frenchman urged the advisibility of a policy of friendship with Germany and attack on England. Recently another pamphlet to the same effect attracted more attention. In this the conquest of England by a French Army Corps is described; in France the mobilization of only four of her 19 Army Corps is assumed to be necessary to effect a landing of 150,000 men, after an English Expeditionary Force has been diverted to Egypt, and the English Fleet has been divided. It is asserted that the latter part of the scheme would be paid for in German gold. It is moreover. the opinion of many soldiers in all countries that France could with success undertake a war against England

Two French pamphlets on the state of the English Navy, which appeared in 1885 and 1887 shew the power England possesses of augmenting her forces in this respect, but they also point out the existing weaknesses of the English Navy, if the numerous duties devolving in on it in time of war are taken into consideration. They also proved the superiority of the French naval artillery. Some paragraphs describe with great clearness England's state of defence as *e. g.* the following.

"In the hour of danger it is the inalienable privilege and glory of a Frenchman, a German or a Russian to take his place among the defenders of his native land, but for an Englishman to be a soldier is an acknowledgment of inferiority. An Englishman's love is Money; he doles it out to procure soldiers; a collection of such persons he calls an army, but for such an army peace is an essential. Carthage also possessed unlimited wealth and a fleet that was unrivalled."

The chief means of defence of British soil, next to the Navy, are the Volunteers These, according to the opinion of their own leading men, such as Captain Wilkinson, are not in a position to hold their own against the regular troops of foreign armies, yet it cannot be doubted that they will have to oppose them in the next big war, as it is hardly conceivable that such a war would end without an attempt at invasion. It stands to reason that such an invasion would, after a successful landing on the east and south coast, have as objective the occupation of London. The Volunteer Officer named above is in favour of the formation of an army of defence composed of all three arms; he is opposed to the reduction of the regular artillery, insists on the necessity of attaching greater importance to fortifications, and shews that although the volunteers of England are conscious of their own powers they are not presumptuous enough to underestimate the experiences of regular armies. In England there is still a belief in the military spirit of the people, and the common opinion is that the material is excellent though turned to bad account. But the economists, and at their head Lord Randolph Churchill, will not hear of a further addition of this material to the existing cadres, and are opposed to the opinion of other authorities such as Lord Wolseley, Sir Frederic Roberts and General Brackenbury.

It is considered unadvisable in England at the present moment, when war rumours are afloat on all sides to undertake the complete reorganisation of the present system of national defence, but probably wrongly;

for the confusion that would arise in England at the present moment, should war break out, would not be less than that which would occur should war be declared in the very middle of a complete military reorganisation. The English War Office is overpowered by centralization carried to excess.

The English military organisation has been undergoing unintermittent changes for years. An attempt has been made to introduce short service, which has enormously increased India's expenditure. A territorial system, called localization, has been attempted. But it is no territorial system, no reserve system in the modern continental acceptation of these terms; for England possesses no reserves kept in training, her reserves consist merely in lists of former soldiers who can be recalled. Although England has destroyed her old long service army of well trained soldiers she does not possess a short service army in its modern sense. She possesses a numerically very weak army, which according to the theory of its organisation, ought to be the most perfect in the world; but it is notoriously behind the armies of other great powers in regard to armament and equipment; and, although the smallness of its members and the absence of reserves should make mobilization an extremely easy matter, yet in reality, as far as power of mobilization is concerned, the British Army is far behind the powers of the continent; and would require a very much longer time for mobilization than any of them.

The expenditure on the comparatively small British army is excessive, and yet in no way obviates the necessity of enormous additional expenditure in the event of war. The English fleet is far too weak for the tasks that will devolve on it, and not sufficiently protected against modern means of naval destruction. England has remained behind other nations in her heavy ordnance, her guns for coast defence, in vanishing guns, in armour plated turrets and defences, and in torpedo warfare. The country lies open to invasion, its ports of commerce are not protected against bombardment or sacking, its arsenals can easily be bombarded, it is liable to lose some of its coaling stations, its international commerce might easily be destroyed. England expects her fleet to carry out the duties of fortresses and field armies; she has no organised scheme for the defence of the mother country; her army reserve is no real reserve; she has no reserve of horses, and she cannot even, owing to this want of a reserve of horses, mobilize the two army corps intended for expeditionary purposes beyond her frontiers; her field artillery is entirely insufficient. There is a deficiency of war *matériel* of every kind, a deficiency of guns and a deficiency of ammunition, not alone in the United Kingdom—but also in Canada which, as regards its defences, is in as miserable a plight as the mother country. England's artillery of position is too weak; the colonies can only obtain this and the necessary ammunition from England and their wants will add materially to the sudden calls, under which the already overburdened War Office may be expected to completety break down in the event of war.

In India, the British troops are only just sufficient for garrison duty; the native troops are unfitted to take the field against Russia. England's agreement with Russia with regard to Afghanistan is valueless; England has from year to year been losing territory under the pressure of the Russian advance, and Russia has been adding to her means of offence.

With regard to the financial aspect of the question it appears that England's defences have been sacrificed for the sake of India's; and that India yet only possesses depots sufficient for the preservation of peace within her frontiers, and is on the point of being ruined by a system that has been thrust upon her, and which in no way meets her requirements. India requires long service—England in Europe short service with large reserves; a compromise has been arrived at which suits neither country.

Waste and confusion reign supreme in the military administration of Great Britain, forming a striking contrast to the scientific system in vogue in modern continental armies.

The system on which the organisation of the British army is to be based in future forms the subject of neverending parliamentary enquiries, which are conducted by numberless committees and commissions. Of the armies of other European nations that of Russia is completely free from parliamentary interference; those of Germany and France practically free, and the Italian parliament has, whatever may have been the condition of the Italian finances, from year to year granted whatever was asked for by the two last excellent war ministries; who insisted most strenuously on the necessity of doubling the artillery, and increasing the strength and improving the equipment of the other arms. The Italian army has during the last few years been increased by 48 batteries of six guns each, and the German army has been similarly increased. The French parliament exercises the most complete control over the details even of the army organisation, yet this in no way hinders great powers being entrusted to competent persons with regard to these matters. The highest council on military matters consisted three months ago of 11 members, of which nine, as all soldiers acknowledge, were among the best soldiers of the French army namely the War Minister, the Chief of the General Staff, further Generals Saussier, Février, Billot, de Miribel, Lewal, Wolff, and de Gallifet, the other two were General Carrey de Bellemare and Bressonet.

In comparison with the well ordered state of affairs existing on the continent in this respect England must take a very subordinate place. In that country military matters at present rest pretty well in the hands of certain individuals, such as the Duke of Cambridge and Lord Wolseley, whose views notoriously do not coincide, and in those of Sir Frederic Roberts, Commander-in-Chief in India, whose views in many ways diverge from those of the two former.

While the great armies of the continent have an average peace establishment of 18 army corps, England can at the present moment only with difficulty mobilise two army corps in India and one at home; and even this can only be done by neglecting the Indian garrisons, which Sir Frederic Roberts declares to be essential, or by filling up the Indian corps with Indian troops of doubtful value in the field.

There is no idea in England of maintaining a sufficient quantity of war matériel of different kinds.

Although men like Lord Wolseley and Sir Frederic Roberts are well able to appreciate the state of readiness for war which exists down to the minutest details, more particularly in Germany and in France, yet the habit of the English to maintain a totally inadequate supply in time of peace is far too strong to be overcome.

In England the principle of appointing every one in time of peace to the post he will occupy in war is not even adopted. There is, it is true, no want of men in England who thoroughly understand the principles on which the organisation of an army should be based, or who could carry out these principles, such as *e.g.* Sir Frederic Roberts, who has successfully introduced a sound organisation for the British troops now serving in India, or Lord Wolseley, the organisation of all of whose expeditions has been carried out with care and energy, and whose "Soldiers Pocketbook" may be regarded as one of the best handbooks that has been written on the elements of modern warfare. But the leaders of the present system do not undertake these necessary steps.

It is beginning to be a pretty clearly understood what will be the very least that England's forces will be called upon to perform. The main points are to be the following,—the necessity of defending England and India; England must be in a position to defend India against Russia and at the same time make a counter attack against this power; she must be able to defend her coaling stations, and beat back an invasion, and at the same time be able to guard the country against a panic. Under a panic is understood a state of alarm which calls forth hasty illadvised military measures. It is assumed in England *e. g.* that if, in the event of war, France were to concentrate a large force at Brest or some other Channel harbour, and assemble a fleet similar to Napoleon's Boulogne fleet, England's fleet would render invasion impossible till after an unsuccessful naval engagement; but that, owing to the weakness of the Military forces available for home defence, a panic would take place in London which would demand the immediate concentration of all English fleets in the Channel, giving up the Mediterranean, and, what would be worse, laying open to a French attack her coaling stations, which form the safeguard of her commerce, all the world over.

There are but few naval officers who think that the fleet is strong enough to hold its own against any possible enemy, or, on account of the many recent inventions, to maintain her supremacy on the high seas in time of war. There is not one who does not maintain that to do so the navy must be free to carry out her own duties, that the harbours and coaling stations must be defended for her, not by her. Many naval officers, expecting that in the event of a war with France the navy will be called upon to defend London, wish to see it defended by a chain of fortifications even at a cost of several millions, and there is not a sailor who does not think that this ought to be done or else that some better means of defence on or near the coast should be devised. Yet it is only a few of the more able English politicians who incline to the view that this expenditure of from 3—5 millions on the defences of London, added to the cost of a re-organisation of her Military forces, would, taking into consideration the enormous interests at stake, be worth the outlay.

Yet it would save England from that much dreaded panic, it would take from the enemy the power of suddenly putting an end to the war by the capture of London should he find himself temporarily in possession of the channel. Were England to fortify London an invasion would become on undertaking that would be hardly worth the risk. Considering the fatal consequences likely to ensue from the capture of London by an enemy the cry for defences seems not uncalled for.

The Volunteers, of which England cannot expect that they will hold their own in the field against an equal number of regular troops of a foreign army, would do excellently for the defence of even only partially fortified localities. The circumference of London is too great to admit of a complete investment were the city fortified.

England in the event of invasion requires time above all things; and if she fortifies her capital and devises some means of defending her arsenals and factories, that will deprive an enemy of the chance of seizing them by a *coup de main*, she will gain the time necessary for the development of her enormous defensive capabilities.

There are some naval officers, among them Admiral Fremantle, who are opposed to the fortification of London, but they share the view of their opponents that the defences of Great Britain are absolutely faulty: only they wish to see the money, some want spent on fortifications, spent on reorganisation of the forces.

It is true indeed that the organization of England's defensive forces is a question of the first importance; that a field artillery must be created; that the troops must be armed with the best, and not with antiquated weapons; that the whole Military system must be altered, yet at the same time it would appear to be advisable to fortify London. How different would have been the position of France, which in 1870 possessed a magnificent if numerically somewhat weak army, had she prior to 1870 spent half the amount on fortifications that she has spent on them since that year.

It is intended in England, should the defences of London come to to nothing, which is more than probable, at least to protect Woolwich against a sudden attack. The same is to be done with regard to the second arsenal, the foundation of which in the interior has long been under discussion in England.

The question of fortifying London has also been considered from a financial point of view; the value of property in London has been estimated at £ 1,000,000,000 and the money needful to procure field artillery, repeating rifles and for the fortifications of London is asserted not to represent too high a percentage on the total sum to be insured; for the seizure of the capital means more than the loss of £1,000,000,000, it means the fall of the empire the complete destruction of British trade.

The wide extension of the British Empire, the great number of its inhabitants, its enormous wealth, the rapid development of its American and Australian colonies: all these afford no guarantee against the danger of an attack on the heart of the Empire. In some ways this great extension of the Empire is in itself a source of weakness. British North America may at any moment make heavy and sudden calls for assistance without being in a position in any way to add to the defensive power of Great Britain. The completion of the Canadian Pacific Railway recently called forth the liveliest expression of satisfaction in Parliament. It is true that this railway running across the American continent through British territory may become of great value to the British Empire; but from a military point of view too great importance should not be attached to it. For it lies close to the territories of a possible enemy, and; even assuming the friendship of the Government of the United States to be assured, there are places between Halifax and the Upper Provinces where a few Anti-English raiders could easily destroy the line; and there are several places where it would be easy to destroy the bridges, and, where even with the greatest caution, it would be difficult to hinder such distruction.

There are similar weak and unprotected points in many parts of the widely extended British Empire.

As has already been stated the British nation is trying to arrive at a conclusion as to the very least that is likely to be demanded of its military forces, and to reorganise the forces on this basis.

Parliament has for some time past granted the justice of the following assumptions on the part of the war ministry, viz:—that the coaling stations must be defended, that further England must be capable of defending herself in India and at home, and that in case of need two army corps should be available for expeditionary purposes beyond her frontiers.

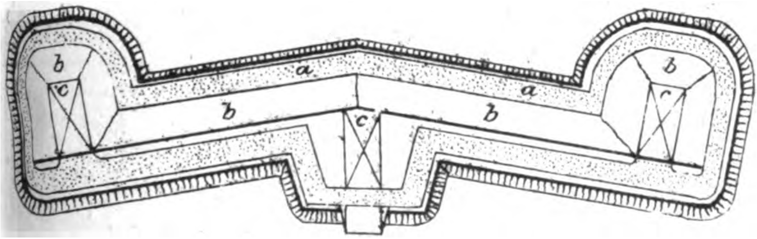
The British forces are on the point of being reorganised on this basis.

Extracts.

("*Militair Wochenblatt*" *7th January* 1888.)

FIELD FORTIFICATIONS.

The writer gives figures of a class of Field work which he maintains



a DITCH *b* PARAPET *c* COVERED SHELTER

struction of shell-proof casemates, by one battalion in from 4½ to 6 hours without the assistance of engineers.

The following advantages are claimed for this form of work:—The ground in front is more completely under fire than is the case with the usual field work. There is no interior space. The men in the front and rear ditches are almost as well protected as formerly, from front and rear fire, and are better protected from flank fire, on account of the "double break" in the trace and the protection given by the casemates. Owing to the very small depth of the work it is more likely to escape the fire of the enemy's artillery, who will find some difficulty in obtaining the exact range.

It is true that the command from the front ditch, in which the line is extended, is less than from the ordinary banquette of a work, but then there is the supporting line, immediately in rear, and their extension of the Empire is in itself a source of weakness. British North America may at any moment make heavy and sudden calls for assistance without being in a position in any way to add to the defensive power of Great Britain. The completion of the Canadian Pacific Railway recently called forth the liveliest expression of satisfaction in Parliament. It is true that this railway running across the American continent through British territory may become of great value to the British Empire; but from a military point of view too great importance should

Extracts.

("*Militair Wochenblatt*" *7th January* 1888.)

FIELD FORTIFICATIONS.

The writer gives figures of a class of Field work which he maintains is a considerable improvement on the present system. The figures given show plans of works for a garrison of 1 company, 4 to 6 companies, and 8 to 10 companies respectively. A rough sketch of the work for 1 company is given below.

In this work the firing line is placed in the ditch *in front of* the parapet, whilst the supports are in the one behind it, or in the covered shelters. The writer calculates that a work of this nature for one company can be completed, including clearing the front, construction of rifle pits &c., as flank defences, erection of obstacles and construction of shell-proof casemates, by one battalion in from 4½ to 6 hours without the assistance of engineers.

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It is true that the command from the front ditch, in which the line is extended, is less than from the ordinary banquette of a work, but then there is the supporting line, immediately in rear, and their command is almost the same. Besides the fire of the garrison is not as a rule made much use of until the enemy have approached to within a decisive distance (the conduct of the distant battle being chiefly the business of the troops who occupy the intervals between the works themselves) and this being so the apparent disadvantage of the low command of the front line becomes really an advantage, because on level ground the deeper the fire is, the more grazing, and consequently effective, is his fire.

Figures are also given of the proposed work adapted to a larger garrison, in which case a somewhat similar parapet with ditches is constructed a short distance in rear of the front face of the work; cover of the shelter-trench type is also provided to the rear of each flank of the front face, and covered ways or zig-zags connect these flank and rear parapets with the front one.

The author sums up his remarks by saying that this form of field work can be constructed in about the same time and with almost the same means as the ordinary work; that it is equal to the latter in its defensive power and is indeed superior to it, except in those cases where a high command over the front is required.

R. S.

(*"Militair Wochenblatt,"* *7th April* 1888.)

CAPTIVE BALLOONS IN THE ITALIAN ARMY.

In the autumn of last year a portion of the Italian army was exercised in the attack and defence of the fortress of Verona. The defending force employed a captive balloon for the purpose of watching the movements of the enemy, referring to which general Pianell, commanding the 5th Army Corps writes as follows:—The service rendered by the captive balloon in observing the movements and work of the evening was especially satisfactory. From the 19th July, on which day the balloon was brought into action, to the conclusion of the manœuvres on August the 1st, the general was kept completely informed of all movements on the side of the attack, and was thus enabled to concentrate the fire of the defence on any portion of the enemy's works or lines of communication that he might desire. The success of this experiment shows the desirability of supplying all Italian fortresses with this valuable accessory to their defence."

On this subject also the Militar Wochenblatt is in receipt of the following information. For the use of the Italian forces proceeding to Abyssinia a very small balloon was ordered in England, whose cubic contents were 180 metres; it was made as light as possible and was capable of carrying an observer to a height of 500 metres. In order to obviate the difficulty of the carriage of the apparatus for making the necessary hydrogen, the gas was prepared beforehand in the arsenal at Naples and packed in small steel cylinders, which were taken out with the force. Each cylinder weighed only 28 to 30 kilos and contained four cubic metres of hydrôgen, at a pressure of 130 atmospheres. Two wagons carried the balloon and its apparatus, together with the 45 cylinders which were necessary for filling the balloon with gas. The cable and apparatus for letting up and lowering the balloon were carried on a third wagon. The balloon could be filled with gas from the cylinders and made ready to ascend, in a hour at the outside.

R. J. S.

(*"Militair Wochenblatt,"* 11*th April* 1888.)

ITALIAN MANŒUVRES FOR 1888.

The Italian minister of war has issued orders regarding this year's manœuvres of the army. In each division a camp of exercise will be formed in which one infantry brigade will take part. There will also be three camps for cavalry, at Somma, Pordenone and Caserta. In the latter half of August manœuvres are to take place in which two army corps will be engaged, during the last 18 days of which the men of one year of the first reserve are to be called out to take part in the manœuvres.

R. J. S.

(*"Belgigue Militair,"* **13*th November* 1887.**)

In the sporting exhibition which which was opened as St. Petersburgh on November 2nd, 1887, an Engineer called Ruckteschill exhibited a new powder, which he has named Silotwor and which is said to surpass every other sort of powder at present known. The St. Petersburgh papers declare that in strength Silotwor is far superior to ordinary gunpowder, that it is without smoke or recoil and that it cleans the barrel instead of fouling it; it is not affected by blows or rough usage and will not explode in the open air, but only burns rapidly; it does not deteriorate if kept in a damp place, but recovers its former properties as soon as it has been dried; and finally its price is not greater than that of ordinary gun-powder. It was intended to carry on some further experiments with Silotwar at Krassnoje Selo.

R. J. S.

(*"Vort Forsvar," Denmark,* 18*th March* 1888.)

A NEW CARTRIDGE POUCH.

A new form of pouch which was invented in Russia, is likely to be introduced into the Belgian and United States armies.

With the pouch at present in use in the British army, considerable difficulty arises when it is required to remove the cartridges quickly for rapid firing; this is chiefly caused by the fact that the top of the pouch instead of remaining open, has to be raised every time a cartridge is required; consequently the soldier, if about to engage in rapid firing, will always before commencing place the necessary number of rounds in his belt, or between the buttons of his coat, if allowed to do so.

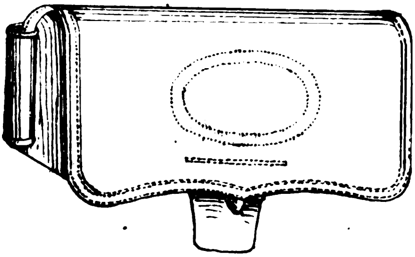
The new pattern pouch, when once it has been opened, will remain so until it is closed again. The top, instead of being fastened on behind by a hinge, comes completely over the back, as well as the front of the pouch; it runs behind in a sort of groove; at the bottom of it a tab is fixed, by pulling which the whole top is drawn down behind and below the pouch, which is thus left open until it is required to close it again by bringing the top up again and over the front.

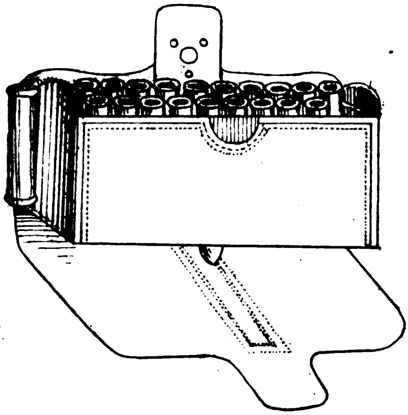
The cartridges are inserted in the pouch with the bullets down, and are kept in their places by means of a leather holder, as shown in the sketch.

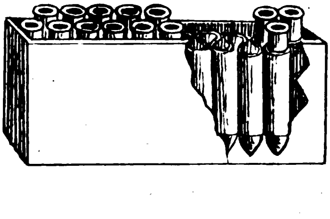
R. J. S.

[I understand that an experimental equipment issued in Burma to the Hampshire Regiment and Royal Welch Fusiliers, contained a pouch constructed on the same basis as that above described. Instead of the top being drawn down behind, however, this pouch opened in front, the top hingeing on the bottom of the front face of the pouch.

R. J. S.]







("*Revue du Cercle Militaire*," *March* 1888.)

(1.)—THE MILITARY FORCES OF AUSTRIA.

It may be useful at the present time to note the following figures which represent the latest information regarding the military forces of Austria:—

19480	... ...Officers
7968	... ...Employés.
881,746	... ...Soldiers (regulars)
246,000	... . .Cis Leithan Landwehr.
2863	... ...Officers of the Honved.
225,215	... ...Soldiers of the Honved.
1,383,272	

The Honved is the *Landwehr* of the Hungarian portion of the Empire. To the above we may add the *Landsturm* which without counting second class (38 to 42 years) gives an effective of 516,000.

(2.)—THE WAR STRENGTH OF THE GERMAN ARMY.

According to the figures given by Lieut.-Colonel Hermann Vogt in a recent publication the field army comprises:—

	Officers and Men.
534 Battalions of Infantry	= 563000
93 Regiments of Cavalry	= 62000
364 Batteries of Artillery	= 95000
87 Companies of Engineers	= 27000
266 Columns of the Train	= 43000

Counting Staff &c., the totals given by him are:—

20871	Officers.
780988	Men.
218592	Horses.
2184	Guns.

This would give for the first line in war about 800,000 men.

On the communications &c, there will be the *Ersatz* troops. These consist of:—

	Officers and Men.
166 Battalions of Infantry	= 239,000
21 Companies of Chasseurs	= 6,700
93 Squadron of Cavalry	= 24,000
37 Sections of Field Artillery	= 17,000
23 Companies of Engineers	= 7,400
37 Companies of Train	= 12,500

The above giving a total inclusive of Staff of

4459	Officers.
296459	Men.
31373	Horses.
444	Guns.

The garrison troops although specially intended for garrison duties can also be utilized in the field army. They are formed from the *Landwehr* and consist of:—

		Officers and Men.
539	Battalions of Infantry	—322,000
21	Companies of Chawens	— 4,800
36	Regiments of Cavalry	— 23,800
54	Batteries of Field Artillery	— 9,000
62	Battns. of Garrison Artillery	— 50,500
48	Companies of Engineers	— 6,500

Total...	11242	Officers.
	416233	Men.
	38943	Horses.
	324	Guns.

Thus roughly speaking we get:—

First Line	800,000
Ersatz	300,000
Garrison Troops	400,000
Total...	1,500,000

(3.)—MARRIAGE OF OFFICERS IN THE GERMAN ARMY.

Officers of the Prussian army have always been subjected to certain obligations in the matter of marriage. The first edict on the subject dates from 1743. The rules now in force are as follows:

(1.)—Officers may not marry without having first obtained the King's permission, unless they have taken their pension.

(2.)—Officers drawing less pay than a Captain of the first class may not marry unless they can show that they have private means amounting to:—

£ 125 in the case of Subalterns.

£ 75 in the case of Captains of the 2nd class.

(3.)—Captains of the first class have only to ask permission.

(4.)—The private income above indicated may include an allowance made by a third person.

(5.)—The income must be proved by a Magistrate.

(6.)—Rules regarding landed

(7.)—and Personal property.

(8.)—Title, deeds, &c.

(9.)—An officer marrying a widow drawing pension, has to pay the full amount of pension into a fund for military widows and orphans.

(10.)—Doctors of the rank of *aide-Major* have to prove a private income of £ 36 (712 marks). As to the formalities necessary before an officer can contract marriage; the commanding officer has to be furnished with the birth certificate of the *fiancée*, certified papers regarding property, funds &c., a certificate on honour that such property is not mortgaged and that it belongs *bona fide* to one of the contracting parties. If not acquainted with her, the commanding officer makes enquiries regarding the lady and her family. When he has satisfied himself he assembles the officers of the regiment, and consults them as to the propriety of permitting the marriage, a representation of all the facts is then addressed to head-quarters and permission is given or not according to the will of the Emperor. The result of all this is that there are very few disreputable or improvident marriages in the German army, and that young men are to a great extent protected against themselves.

E. G. B.

Simla, *1st June* 1888.

EXTRACT FROM LETTERS FROM TONKIN OF THE LATE LIEUTENANT NORMAND, 16th CHASSEURS.

These are extracts from the letters of a young French Sub-Lieutenant M. René A. L. V. Normand. His first commission dated from the 1st October 1882. He was killed in the action at Bang Bô on the 24th March 1885, so that he had about two and a half-years service at the time of writing. His regiment was the 16th Chasseurs and he was attached to the 111th Regiment of the line as a volunteer after two or three applications for service in Tonkin. The letters were most of them addressed to his home; others are to the Colonel of his regiment, the 16th, and to his brother Subalterns in that regiment. These letters together with others regarding M. Normand's death were collected and published by his father Colonel Normand as a memorial of him. Colonel Normand was chief of the recruiting staff of Paris and great sympathy was shewn him at the loss of so promising and brilliant a young officer as his son. The letters begin by describing the voyage, the troopship, and his comrades on board. As a Frenchman he naturally notices with regret the great preponderance of the British ensign among the shipping they met with. At Aden they landed, and while calling at the French consulate, met some English Officers who were calling there at the same time, their regiment having only just arrived at Aden in relief. The English Officers made the French welcome, invited them to dinner and so on, and are described as very good fellows. The English Soldiers were in white uniform and to the Frenchman appeared "dazzling". The latter must have enquired how the men managed to keep themselves so clean and smart, and express their astonishment at hearing that the men had seven changes of uniform. They also saw some Native Soldiers; in the letters they are called the 3rd Bengal, but this must be a mistake for the 3rd Bombay, or some other regiment. The men are described as dressed in green serge, as being tall strapping fellows, well set up, and well drilled. Aden itself was considered almost impregnable both on account of its natural strength and from the amount of guns mounted, it being described as bristling with cannon. This opinion though from a very young officer will be consoling, to those who are led to believe that our coaling stations are miserably neglected. Nothing of any interest occurred during the passage to Saigon where he arrived on the 23rd December 1884. Here he makes a complaint against the Post Office, and officers who have been in Burma will sympathise with him. It seems that his letters were addressed to Tonkin and that the officials refused to give any out in Cochin China, that were so addressed to Tonkin. The mails were probably made up in bags, but there is a hearty grumble at not getting his letters, regardless of the trouble that would have been involved in breaking open the bags. At first sight everything was naturally delightful to M. Normand and his two comrades, Lieutenants DeLa Londe and Portien. The climate was good, and everything new and interesting. The news of the war was not encouraging. The sickness among the troops everywhere and the reverses suffered in Formosa were disheartening. On the 9th January he arrived at Haiphong a short distance journey by river steamer up the Red River. The rest I will give in extracts from his published letters.

Jaikam 17*th January* 1885.

" * * * * There (Haiphong) we got our orders, and I was glad to hear that the 111th were not at Tuyen-Quan, as I had been informed, and as I wrote and told you, but at Chū, and had taken part in the last engagement. We waited till the next day, the 10th, and then went on board the gunboat the "Eclair," with Colonel Giovanninelli, who was going to take command of Nègrier's brigade, as the latter had been told off to feel along the Mandarin road to Langson, which passes by the defiles of Bac-Le of evil memories. We arrived in camp at Chū at 1 o'clock in the afternoon of the 11th. On the height taken from the Chinese, a citadel of earthwork and bamboos has been built, round which the 3,000 men composing our column are camped. We were presented to Colonel Donnier of the Foreign Legion, commanding the camp and afterwards to General Negrier who does not resemble his likenesses; he is a little spare man with clear blue eyes that sparkle like lights. He wears a beard, but in spite of that does not appear more than 35 years old. He is always on the move and the men have christened him Maoulen, which means "quick" in Annamite."

Lt. Normand had a letter of recommendation to General Negrier and was passed by him to No. 2 Company of the 111th. He arrived at Tai kam where the regiment was camped on the 11th and was delighted with his future brother officers.

"Our commandant Fame is very strict but very kind, and received us very well, Portier and myself. My Captain, Captain Verdier is quite young and is going to be decorated for his behaviour in the last engagement. He comes from Nimes and takes everything lightly or at least appears to * * * The men with a few exceptions who have fever are very well. I found a greater number effective than I expected. We have about 110 men per Company available for the march, and all the officers are unanimous in praising the determined resistance, and the bravery of these poor devils, who have nothing but blows to win out here. Our get up is a sight to see. All our helmets have been covered, by order, with black cotton cloth, as white was too plain at a distance, and served as a mark for the enemy. Beards are worn, and when, as is not unlikely, the men have made gaiters for themselves out of an old pair of red trousers and their straps and buckles out of bits of cord it makes them look the most fearful brigands.

We are very well off at Tai kam. Our lodgings are Annamite "cagnus" a kind of mud hut covered with Straw. We have had bamboo beds made for ourselves, on which we have spread stuffed Cambodian mats, and with my travelling rug, I sleep soundly. Our batman is a good cook, and as supplies are abundant, we live like millionaires. I look after the mess. My Captain and myself spend five francs a day. Here is our bill of fare for this morning's breakast. Onion soup, cold fish, mustard sauce, stewed mutton, steak and potatoes, jams, cheese: coffee, tea.

On the march though, it will be a bit of preserved beef and some biscuit to last us all day long * * * Our column marches on Langson over the hills. General Briere de l'Isle will accompany us. Colonel Giovanninelli will command the column which will be composed as under.

The 143rd Foot (1 battalion)
The 111th „ (1 battalion)
3rd Algerian Rifles (1 battalion)
The Foreign Legion (1 battalion)
Lastly the Marine Infantry (1 battalion)

That is 5 battalions, making up 3,000 men and two batteries of Mountain Artillery of guns of 80. We reckon on starting on the 25th (January). Parallel to us General de Negrier, with the two newly armed battalions, most of the Marine Infantry and the remainder of the Foreign legion, marches on Langson by Kep and Bac Le. Tomorrow or next day the 143rd and ourselves, together with a battery are going to reconnoitre towards Do-Sung, in the hills. We believe we shall see the Chinese. I hope so. That is how we stand at present. * * * We hope here that an expedition which has lasted a year and a half, and for which at least 20,000 men must have been sent out from France, will deserve a medal being given to those who took part in it. We have often been engaged, and shall be again seriously. The Chinese, if they like, can be tough chaps."

His next letter is dated Kep-ha the 22nd January, the column having apparently reached that place on their road to Langson * * "On the 17th Colonel Giovanninelli having been informed that the Chinese had been requisitioning rice at Liem-Song 7 kil: (4½ miles) from Tai kam we started off without our kits for Liem-Song. Sure enough the Chinese were there, and bolted leaving the rice in charge of a rear guard, which fired on us for a few minutes, and then suddenly disappeared. Just now we are making the roads, absolutely necessary for keeping up our supplies, when we march on Langson, for now we enter a regular hilly country. It is really cold here. Our effectives are very much reduced. We have only 95 men per company left fit to march; but from what I have seen so far one may go a long way with them. As soon as they sniff the Chinese, it is all one can do to keep them from dashing on them before the right time."

In another letter dated from the same place Kep-ha the 31st January M. Normand writes. * * * * "Every day we get under arms, march from 10 to 15 kils (6-9 miles) take up our position, and under cover of us, the forced Annamite coolies build the road under the direction of the Engineers. At evening we form the rear guard, and the column, comes back into camp. We are getting on quickly. * * * The Chinese are quite close to us. On the 26th I was on advanced guard when the Deo Wang hill was reconnoitred. At 11 we make our long halt, at 12 the Chinese shew themselves on the slopes of the hills. As the General had forbidden petty engagements, we quietly withdrew. The Tonkinise riflemen could not however resist the temptation of firing on them as they hate the Chinese more than we do. I was forbidden this pleasure, but these gentlemen took it. I had the pleasure to see, 350 yards off 7 or 8 Chinese bite the dust. They are big fellows, clad in blue (Konang Si province) with their straw hats, hanging over their backs, and rifles slung across the shoulders."

The composition of the two columns seems to have altered and the whole seem to have met at Deo Vig under General Briere de l'Isle. General Negrier Commanding the Brigade in which was Sub-Lieutenant Normand's Regiments.

Dong Sang 7th February.

"I write after the three days marching and fighting we have just been through. The Chinese got a tremendous thrashing * * * Poor de La Londe was wounded but though severely, not dangerously. They thought the ball had gone through, but it only went round his chest and through his arm. It is a matter of 3 months care and very likely of the red ribbon which will be a capital poultice for his wound. I know one ought not to envy another for that sort of thing, but I can certainly say that he is not so very much to be pitied.

We are going to start for Langson, which will be taken before eight days are over * * * *"

Dong Sang 9th February.

"I regret the easy and off hand way I spoke of de La Londe, but you who know how excited one gets in such cases will excuse me."

In the action at Dong Sang 30 were killed and 150 wounded. "You cannot imagine, he continues, what a stiff business it was * * * Forgive my not finishing; we are getting under arms, the Grand Guard on the Langson Road is attacked."

Langson 16th February 1885.

"I write from that famous Langson the object of our efforts and which we have not taken without some trouble. * * * On the 9th we got the order to march (from Dang-Son) and heard that the Chinese from BacLe, whom we had driven in, and who were retiring on Langson, had attacked during the night the Grand Guard of the 23rd Regiment, and surprised a sentry, whose head, according to their custom, they had cut off. The Foreign legion took up a position on the hill of Deo-Quan and exchanged shots with the enemy all day long. That was the engagement of Deo-Quan. On the 11th the whole column started, the 1st Brigade as advanced Guard, ours following; we march across hills and woods the whole day long, and catch up the 1st Brigade at 6 o'clock in the evening 4 miles from the hill of Deo-Vij. We camp while it still goes on raining, in the mud on the top of a hillock. Since leaving Dang Song we have neither bread, nor wine, nor fresh meat. We live on biscuit, preserved meat, and tafia (rum arrack). On the 11th at 5 o'clock in the morning we start. We know from the reconnaisance that the enemy is not far off. We follow along the side of a hill, on a muddy and slippery path, where the men have to move in Indian file. The Mountain Artillery on the backs of mules is in front, and the poor mules stumble and fall every minute. One rolls right down with his ammunition boxes, and gets killed. The fog envelops us, and we fear every moment we shall be attacked. What a march, my goodness, and that for 5 hours. At 10 o'clock we stop. We are at the pass of Deo-Vij. All we have now to do is to get down to Langson, which they say is only 5 miles off. General Negrier concentrates his column a little. "In war one must be patient," he says to us as he looks at the column moving on, one man at a time, slowly, and dashes at the same moment at an unfortunate section of Artillery, stuck, crying out, why don't you get on d—it. This makes us all laugh, he first. We think we have time to eat something. We have hardly opened a tin than off we go. There is nothing more for the rest of that day. First go the 143rd then ourselves the 111th, and behind us the Artillery. We cross three or four irrigation streams with water half way up our legs. * * * At one o'clock we hear shots in front of us; the 143rd have come up with the enemy. We hurry up, we run, in spite of our fatigue, and of the path, which before we could hardly march on, and soon we are in sight of the engagement. It is a big plain covered with hillocks shut in between 2 ranges of mountains. About 2 or 2½ miles in front of us is the village of Pho Vy, from which the action takes its name. We stop, with the 143rd, on a hillock on our right, to let the Artillery come up and feel the ground in front. The 143rd have a few wounded. * * * * The good Chinese seeing us on our hillock open out a pretty lively fire on us; we answer with a few well directed volleys, and the Artillery in position, plants a couple of shell right into the middle of them, and brings down a good many. They run for it, and we descend into the undulating plain. The 143rd on the right, we incline to the left, and the 23rd coming in between ourselves and the 143rd we become the left of the line. We advance in formation for attack. My section as skirmishers, that is in the front line. We pass through the village of Pho-Vy. forsaken by the Chinese; only the bodies of the victims to our shells remain, three of them are burning with their clothes on fire much to the pleasure of our men. We climb up a pretty big hill, and all at once receive the devils own fire. Balls whistle everywhere; two of my men fall wounded. We reply with a pretty well directed fire, but the Chinese are about 1,300 yards off, and there are a great many of them. Three times we silence their fire, and three times they open out again, from different parts of the crest of a mountain in front of us. At last they retreat, but it is not over. Further off we see their flags planted on a hill to the left, and some more on a little hillock in front of us, which seems nearer. The Artillery follows them up, but they stop at this hillock and as usual wave their flags. Evening is falling, one must finish off. "General Negrier impatient sends for Colonel Herbinger.* * * Take, (he says.) the two Companies of the 111th that are there (the first and my own, the second) and go and take the hill where those three flags are waving." 'As our Lt. Colonel seems rather surprised at the hazardous nature of such an undertaking, he added, 'The Artillery will support you.' So off we go 450 yards from the hillock, the Chinese pour bullets on us There was such a whizzing, words of command could not be heard. The Colonel, with a good deal of decision and judgment, turns round and gives the word to charge. Sword in hand I put myself at the head of the Company and away we go. We have not gone 20 yards before we come to an irrigation canal about 6½ feet broad, hidden in the grass and looking very deep. Next to us was Captain Zassanoff of the first Company. 'Can you swim,' he cries out? 'Yes' I say 'a little.' In we go finding the water up to our waists, and climb up the other, bank. * * * Arrived at the top it was not all over. The Chinese driven from the hillock still held on at the foot of it. From our right and left, from the surrounding heights comes such a fire, as only repeating rifles can keep up, such as the Chinese have. Night was falling, the Chinese trumpets were sounding ominously. I ordered my squad to fire a few volleys at the Chinese in front of us, who bolted, but not immediately. For a quarter of an hour they held on, and then gave way everywhere. * * * We passed the night on the hillock without tents, drying ourselves as best we could by fires and eating with our fingers, pieces of pork and duck, which our men had taken, and which our batmen cooked at the end of sticks. I shall not astonish you in telling you, it was the best dinner I ever tasted.

On the following day, the 12th, the 1st Brigade, rifles and Marine Infantry go in front and defile past us. The regiment (23rd, 111th, 143rd) assembles, General Nègrier passes down in front of us. 'Well done, boys, you went through them like butter,' and ordered us to be in the reserve. As a fact we had 2 killed and 13 wounded which is something for our small number of effectives. We marched like this all day long, following the first brigade, and hearing the sounds of the engagement, without seeing it. There is no position more trying or dangerous; trying because one sees all the wounded and I am not yet accustomed to do that in cold blood, and dangerous because one gets all stray shots, the number of bullets and jingal shot we heard falling was absurd. Every corps had some wounded and even some killed. Poor Bossan son of the General of the Marine Infantry, and orderly officer to general Briere de l'Isle, was killed behind a hill, near the General in chief command, and 100 yards from us. * * * To sum up, this action of the 12th at Bac Vye was splendid, and decisive. The Chinese have given up all forts and positions in front of Langson. The only thing to be deplored is the way the Algerian rifles were knocked up, who themselves alone lost about 150 men, of whom 5 were officers. Poor Turcos, the numbers I saw bowled over in the rice fields. It was their own fault, they dashed forward like madmen without listening to their officers who likewise suffered through them. We did not reach our bivouacking ground till 7 in the evening, having been on the march since 9 in the morning. We had the satisfaction of seeing the bodies Chinese along the road, well, as many as you like. We were very glad the Turcos were revenged, which was good.

MILITARY TRAINING.

Twelve years ago spending the day with Prince Woronsoff (père) near Livadia (Crimea) we were taken some six miles into the hills to inspect a Sotnia of Cossacks that had lately been experimentally mounted on long backed mouse coloured Circassian horses about 14-2. Just as we arrived on the ground, the men came riding in first by twos and threes and then in groups of larger numbers. In half an hour they had all assembled and were ready for an inspection which was most minutely and carefully performed by the Prince himself. Every saddle was taken off and put on again, every hoof was looked at, as also the horses' mouths and eyes. A few words of approval given, a filial shout from the men to their "papa" (all senior officers are "papa") and the men dispersed to arrange their bivouac and cook a little food. Whilst hard at work at a "lonchon a la fourchette" some of the young ladies (how charming they were too) had extracted from me the fact that I had never seen a Cossack dance. In a few minutes the men were made to form a semicicular background and some half-a-dozen youngsters began their gymnastical exercises (*sic* dance) which no one can ever attempt who has not commenced to learn them as a two year old; the back ground singing the while. After ten minutes or so, they were dismissed and returned to their occupations. Everything seemed quite natural and unexceptional.

It may be imagined however, what thoughts passed through my mind when I was quite casually informed that these men had just ridden 76 verst viz:—over 50 miles! This struck me as training with a vengeance.

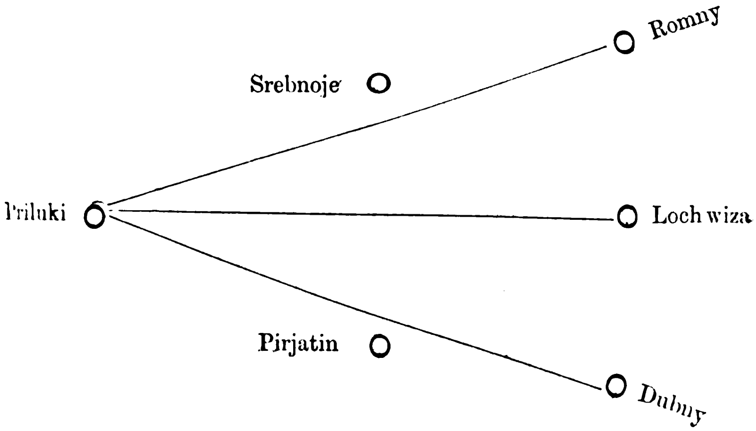
Would any of our regiments be asked "as matter of course" to perform a national dance, in the midst of their cooting after a 50 mile ride?

Our future *vis à vis* in Central Asia have not become slack in this respect since then, as the following extract will shew:—

"Few will now-a-days doubt the importance of that training which tends to inure troops to the hardships of reconniassance and outpost duties and of long marches, nor the fact that these difficulties have an increased significance when the severity of the Russian climate is taken into consideration. The more difficult and trying the circumstances are, under which these duties have to be performed, the more necessary it is to prepare the troops gradually to bear them, and by experience to ascertain the best means of preserving health and strength.

"For these reasons, which are equally applicable to all arms, the 9th corps carry out during the winter months a course of marches both on foot and on horseback, which being combined with tactical exercises, become complete manœuvres if only the weather and the condition of the roads will permit.

"As an example of such training we cite an exercise carried out by the 9th Cavalry Division in December 1887, for which the following idea formed the basis:—



The town of Priluki, in which is quartered the 27th (Kiew) Dragoons (6 Squadrons), was taken as the objective point. It was supposed that the town was occupied by a strong force, and that it was partly fortified. Two Squadrons of the 25th (Kasan) Dragoons at Romny, two Squadrons of the 26th (Bug) Dragoons at Dubny, and five Squadrons of the 1st Ural Cossacks at Lochwiza, in all nine Squadrons received orders to start on the 17th and to reconnoitre Priluki on the 18th and, if possible, to attack that town from different sides and to occupy it.

" In order to ensure the marches being properly carried out, and the reconnoitring duties correctly performed orders were issued to the Cossacks (who were to move by the Lochwiza-Priluki road), to attack the Kasan Dragoons on the 17th between Romny and Srebnoje and the Bug Dragoons, on the same date, on the Dubny-Priluki road. These attacks resulted in the former discovering the enemy in time to guard against the danger of a surprise, and in the latter falling into an ambuscade.

" On the evening of the 17th the original idea of attacking Priluki was again taken in hand.

" The 27th (Kiew) Dragoons, who formed the defenders of Priluki, were inspected by the Divisional Commander on the 15th, 16th and 17th and on the evening of the last date received instructions to reconnoitre at 7 the next morning the towns of Srebnoje, Lochwiza, and Pirjatin, and also fo take measures for properly defending Priluki.

" The first collisions occurred at about noon, and were brought to a decisive issue an hour and a half later. A snowstorm which gradually increased in severity, was raging the whole time and as it was accompanied by 15 F. of frost the troops were compelled to take refuge in Priluki.

" As the weather continued inclement on the 19th a day's rest was granted although this had not originally been contemplated .

" On the 20th the troops with the exception of the Kiew Dragoons, started on their return to their own stations, which they reached the next day (21st) but not without again being overtaken by a violent snowstorm. The main difficulty of this return march, lay in the fact that the depth of the snow, which reached to the horses girths, made it impossible for the troops to dismount and warm themselves by marching. ' In spite of this however very few men were frost bitten, and those that were suffered no serious after effects.

"Thus the Squadrons of the Kosan and Bug Dragoons as well as those of the Ural Cossacks covered in four days about 133 miles, or at the rate of about 33 miles in 24 hours, and that notwithstanding that all precautions for safety had been taken and engagements fought.

"The severe frost, and more especially the extraordinarily violent snowstorms the troops encountered while on the march, and during their engagements with the enemy, gave rise to hardships and difficulties such as would seldom be met with in real warfare, but nevertheless all the exercises were carried out with as much precision as could be expected under the above conditions. Not a man or horse was left behind. and all, including those who had been frosted bitten, reached their destinations in comparatively good condition. (From the M. W. No. 47,—1888. *(Tr. by Captain J. W. Hogge.)*

There seems something terribly earnest about *that* kind of training.

A few years ago we read of a Russian Dragoon Regiment being practised swimming a river at a cost of several lives. Had a few men been snowed up, or a few limbs lost on the field day above described, no one would have remonstrated. There was none of that fuss made in Rrussian newspapers as appeared in our home papers when a boy soldier succumbed to heat a few years ago at an Aldershot field day.

War, real war, demands no more earnestness than preparation for it, and the best preparation after all things to make war with (not the *soldiers* duty, but that of his fellow countrymen,) have been found, is military training, understanding this to be the exercise of duties in peace which will have to be performed in war. On the principle that what has been done once can be done again, it is essential that the military should practise occasionally those hardships which they may at any time be called upon to perform as a matter of course. No doubt many of the officers and men who undergo exceptional hardships in peace times never have the opportunity of taking the field. Especially is this so with short service men; but the moral effect remains. Those regiments who have special feats to their credit, though these may have been performed a century ago, will have the best chance of performing similar feats in future. The tradition that it was a common thing to march 30 or 40 miles a day then, will go a long way towards permitting the present generation of doing the same. But military training cannot always be heroic. It is the irksome continuous weekly "Strapazen" of the German recruit that makes the uncomplaining finished soldier.

It well behoves us to consider more carefully what the special "Strapazen" are which the Russians may have the pleasure of eliciting from us sooner or later. The theatre of war presents sandy deserts and snow covered rocks. Both offer distinct and opposing conditions.

Our training should be with reference to both extreme conditions. As a matter of fact the training we give is only under "ordinary" conditions, an average between the two extremes of heat and cold such as we shall have to experience but which is not fairly represented by the climate of our cold weather drill season.

It may be doubted if the Kiew Dragoons in their above named return journey would have brought back with them, a single camp follower or grass-cutters tat such as our cavalry regiments are furnished with. Even our Kahars would under such circumstances require, boots, blankets, warm clothing, tentage, transport exactly the same as the fighting man whether black or white. The follower is least able to stand the extreme cold, and should naturally receive the greatest care, in the form of tenting, clothing, feeding. Is this recognized by us? The follower forms an important and integral part of our fighting forces. Our Training to be perfect should therefore include that of our followers as well, but this in extreme forms cannot be undertaken in time of peace unless the followers are put on an equal footing with the troops as regards physical comforts.

H. A. S.

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2. Contributors may write anonymously if they prefer do do so, but they should append a *nom de plume* to their papers to allow of their being communicated with in the "Answers to Contributors."

3. Papers will be published, if passed, by the Executive Committee of the Council.

4. The Council do not undertake to authorise the publication of such papers as are passed, in the order in which they may have been received.

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The Journal
OF THE
United Service Institution of India.

VOL. XVII. 1888. No. LXXIII.

LECTURE ON "THE BULGARIAN ARMY."

BY COL. G. T. CARRE, R. A.

Chairman. Major-General T. P. SMITH, *R. A.*

THE LECTURER VISITED BULGARIA LAST AUTUMN AND THE RESULTS OF HIS OBSERVATIONS, HAVE BEEN SINCE EMBODIED IN A PAMPHLET.

The army is recruited on the principle of universal compulsory service, exception being allowed only in the case of priests, the only sons of widows, and Mahomedans, who pay £20 exemption. Every young man throughout Bulgaria is obliged, at the age of 20, to send in his name and residence to the recruiting officer of the nearest depôt and, after medical examination, he passes into the service for two or three years, the length of service with the colors for the infantry being two, and for the cavalry and artillery three years.

Should any village produce more than the number of recruits required for the year, the candidates are drawn by lot. Volunteering for cavalry and artillery is permitted, otherwise the recruit is posted to that branch which the recruiting officer considers him best suited for. The strongest men go to the artillery.

On the completion of a soldier's service with the colors, he passes into the first reserve for eight years, during which time he may, at any moment, be ordered by the recruiting officer to rejoin his regiment. The Minister of War issues yearly orders as to the time and duration of the drill of the reserves. Certain districts are sometimes exempted altogether for reasons arising from the state of the crops, sickness, or other local causes.

Military service commences at 20, and ends at 40 years of age, during which time all, who are not at their drill, either with the colors or first reserve, belong to a National-Guard, forming an armed peasantry. They have no uniform, but keep up a certain number of rifles; they are drilled once a week, generally on Sunday afternoons, by drill sergeants sta-

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When a member appears in orders for leave to England, his Journal is not despatched unless he asks for it, and while absent from India his subscription is not payable unless the Journal is supplied.

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1. All papers must be written in a clear, legible hand, and only on one side of the paper. All plans must have a scale on them.

2. Contributors may write anonymously if they prefer to do so, but they should append a *nom de plume* to their papers to allow of their being communicated with in the "Answers to Contributors."

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Military service commences at 20, and ends at 40 years of age, during which time all, who are not at their drill, either with the colors or first reserve, belong to a National-Guard, forming an armed peasantry. They have no uniform, but keep up a certain number of rifles; they are drilled once a week, generally on Sunday afternoons, by drill sergeants stationed in the principal villages; they are often called out to assist the police, or act as guardians to the roads. In addition to the above, there is a corps of Gendarmerie consisting of 2,000 horse and 4,000 foot: the former being mounted on small country-bred horses, patrol the roads, travelling all over the country. In time of war they form a cavalry reserve, and, on the army being mobilised, carry the necessary orders to the mayors of the towns, and headmen of villages. The dismounted portion act as police, in which capacity they may be constantly noticed at police stations.

The total standing army in time of peace is 546 officers, and 25,580 non-commissioned officers and men; on war footing the infantry are trebled, and the artillery doubled, whilst the cavalry are always kept up to their full strength. The men necessary for the increase come from the first reserve; their arms and necessaries are stored with the regiments, and the extra armament for the artillery is kept in the gun-parks. Soldiers complete their service with the colors on the 15th October, the recruits joining on the 1st of November. The first fighting line may be calculated at 70,000 men, the first reserve at 100,000, and the National Guard at 130,000 making a total of 300,000 men ready to fight for their country.

For increase to the war establishment, a complete equipment of arms, clothing, and necessaries is kept ready for issue at each regimental and battery store-room, the shelves in which are so divided that the tunics, trousers, caps and fatigue dresses of every two soldiers are kept separate, each one's name and number, together with his size-roll, and the village from which he has to come, being ticketted on the shelf. The arms and boots are also stored ready for use. The batteries are raised from four to eight guns.

Their system of mobilisation is as follow: a recruiting officer is stationed at the depôt of each military division; he has the name, description, and address of every reserve man printed on separate cards, and arranged in packets for distribution at each village by the mounted gendarmes. On receipt of his card with orders, each reservist joins at once, he being perfectly aware at which barrack his regiment is quartered, as they never change. He is taken to the store and fitted out with the clothing and arms corresponding with his mobilisation card. So admirably has this system been found to work, that the whole army has been mobilised in three days. It is perhaps hardly necessary to to say that, to prevent accident, no reserve man is allowed to change his residence or travel without a passport, which in his case, has to be recommended by the recruiting officer.

The country is divided into three military divisions: (1) Sophia; (2) Philippopolis; (3) Shumla. Each division consists of 4 infantry regiments of 4 battalions, one cavalry regiment of 4 squadrons, and a regiment of artillery of 6 field, and one mountain battery. At Sophia there are, in addition, the Prince's cavalry escort of one squadron, and one battalion of "Pioneers" of 7 companies.

The infantry are armed with Berden improved rifles, and have the bayonets always fixed. They carry their own kit and camp equipage, together with 140 rounds of small arm ammunition. Without taking into account the weight of the rifle and bayonet which together weigh 10lbs., each soldier carries 47lbs. They drill and manœuvre with a full marching kit, and, accustomed to the load, do not seem to find it excessive; the valise hangs very low, the principal weight falling on the hip; the great coat and blanket, when not in use, are carried rolled over the shoulder; and outside the coat is wrapped one-sixth part of a 'tente-d'abri.' Sixty rounds of ammunition are carried in two expense pouches, attached to the waist belt, in rear of which hangs the entrenching tool; the remaining eighty rounds are in a bag, slung over the left shoulder while a tin water bottle, with canteen combined, hangs from the right.

The dress of officers and men is very similar to that of the Russian army. The soldiers wear, in full dress, a sheep-skin cap, with badge and Bulgarian cross in front, a dark green double breasted tunic, trousers of the same colour, tucked into high boots reaching to the knee, and bandages over the feet in place of socks. In undress, a cloth forage cap is worn. In summer the dress is of white canvas, and forage cap with cover. The cost of the man's total kit and necessaries is 75 francs, including the fitting and making up which is carried out under the supervision of commanding officers. On the march, the men wear their sandals and sheep-skin, and carry their long boots in the valise.

The ration varies in kind to suit the season of the year; a monthly printed scale is hung up in each cook house by the side of a black-board; the officer on duty in each battalion calculates, on the board, the total amount of each article of supply required for his men, and signs his name to its correctness; previous to the issue of the cooked ration, he tastes and examines a sample. The ration consists of bread and coffee in the morning, a midday meal of bread with meat and soup, and in the evening, a bread and meat supper; on Sundays wine is added. The soldiers sit down to their meals in uniform, the non-commissioned officers eating with the men. Their grace consists of the Lord's prayer and a short prayer for the Prince, which is sung, the men standing up.

There is little or no crime; the proportion of sick in hospital is small, and disease usually incidental to European garrison towns, hardly exists. The soldiers seem happy and contented. Their physique is fine the average height is 5 feet 8 inches and the men are very level. The officers are paid as well as in the British Army, but the men receive only one franc per month as tobacco money. The non-commissioned officers, who are allowed to extend their service with the colors up to 10 years, receiving a small pension on discharge, can, however, earn pay up to the large sum of 60 frances per month.

The Bulgarian army still remembers its late exploits with the bayonet when fighting against the Servians, and has great confidence in a hand-to-hand combat; in consequence the object of their present drill seems to tend to the aim of getting at their enemy. They commence their advance in the usual infantry attacking formation until the intensity of the enemy's fire compels them to seek for protection under cover, which they obtain with remarkable rapidity in the stoneless loamy soil of the country by the use of the half spade half trowel each soldier carries on his waist belt.

The supports being under cover the advance is continued until the first fighting line arrives within striking distance of the enemy, when rising from the ground, the whole line, supports and all, with bands playing the Maritza and colors flying make a rapid rush with the bayonet. In actual fighting the charge would probably take place simultaneously along the whole line and is likely to be successful against an enemy like Servians weak in fire discipline. Their own army is remarkably obedient even to the extent of saluting an officer before speaking to him under heavy fire.

No one travelling through Bulgaria can avoid remarking the strong national feeling that exists amongst the peasantry, and the calm indifference with which they seem to disregard the present state of affairs at Sophia.

On talking politics to the people I casually met at the small roadside inns and baiting places where I happened to stop, I invariably found that they had quite settled in their own minds that Russian intervention was not to be, and that their future was secure now that a prince sat on the vacant throne. The national Bulgarian stubbornness came forward very prominently: they had formed their own opinion and would listen to no other, refusing even to argue on the subject. Stambouloff has entirely won their hearts, they place implicit confidence in his actions and as the leader of their national assembly are prepared to follow his guidance at any risk. The army also is a very strong loyal element and exercises considerable influence over the agricultural classes. The officers are to a man for the Prince and strictly ante-Russian; they are well aware that a return to the old Doudakoff régime means death to their ambition and advancement to the higher grades in the army. The private soldier looks up to his officer as a leader, not only in the field and barrack room, but also in politics, so that they also hold the same opinions. Every October 12,000 soldiers return to their homes on completion of their service with the colors; these spread loyal principles throughout the length and breadth of Bulgaria, repeating at their own fireside, the sayings of their officers embellished with barrack room ideas of their own prowess and powers of resisting foreign invasion. With this element in full work it is not surprising that the national feeling I have alluded to is common throughout the country. The officers also at their mess tables talk politics and are inclined somewhat to boast of the power of their army, comparing it to those of the weaker neighbouring States; they, too, chat in the cafés with their civilian friends whose commercial interests being equally at stake in the independence of Bulgaria, warmly espouse their military brethren's belief and would prefer risking an appeal to arms rather than submit to the interference of any of the powers who gave their country existence ten years ago. They ask the question "Why should Russian interfere with us? Our country is well governed and prosperous. Look at our yearly increase of revenue, and the number of new buildings that are rising in the suburbs of every town and village throughout the land. Look at our children who with books and slates in their hands run laughing to school instead of playing in the gutter as in days gone by. We are a nation of progress, and for the further improvement of our resources only require rest and to be left alone. Look at our army, it is the most rising in Europe, the 100,000 soldiers we can place in the field are no raw conscripts carrying arms they know not how to use. Much the reverse, they are a fine band of young agricultural labourers accustomed to hardships and frugal fare, who to become soldiers have undergone a strict course of drill and instruction, who can march, carrying their heavy kit, thirty miles a day and fight at the end of it. They are led by officers who for the last eight years have made the art of war their one thought and study. Some of them may be young to hold the important position, they do, but they are full of energy and have confidence in their own capabilities as leaders, and we also have confidence in our army and as a nation will stand in the strength of our own arms, and in the knowledge of the justice of the cause we espouse, knowing that the god of battles is the God who grants protection to a just cause."

From my own personal observation, I agree with them and think that the Bulgarian army would be found tough customers to meet in a fight and that, man for man, they would hold their own against a more veteran army.

Bulgaria could never expect to stand alone against the enormous strength and resources of the Russian empire, but the fact that the interests of other nations are involved with hers and are indeed the very causes of her existence, is well known to every Bulgarian. All regard Austria, England and Italy as the three European Powers to whom she may rightly look for more than support; and personally, I sincerely trust the Bulgarians may be right in their anticipation of aid from them.

HORSES REQUIRED FOR THE INDIAN ARMY.

DELIVERED BY MR. HALLEN.

The several classes of horses required for the Indian Army are as follows:—

Horse Artillery.
Field Artillery.
British Cavalry.
Native Infantry.

2. The horses for the Artillery and British Cavalry are the property of the State and are mostly obtained from Australia, the Persian Gulf, and the Cape of Good Hope, A few bred and reared in India are also bought for these branches of the service.

3. The organization of the Bengal and Punjab Native Cavalry is on the Silladar system and the men are mounted on Indian bred horses, and a few of foreign breeds; these are the property of the men of the regiments, not of Government.

4. The Madras Native Cavalry are mounted by the State on horses from the Persian Gulf, and Northern India, and some Indian bred horses. The Bombay Native Cavalry are on the Silladar system and the horses are the property of the men of the several regiments; their horses mostly come from the Persian Gulf, but there are also a few of country-bred stock.

5. The stamp of horses required for the different branches as above noted may be described as follows:—

For Horse Artillery.—Well bred, large jointed, good limbed, active horses from 15 hands 1 inch to 16 hands 1 inch in height.

For Field Artillery.—A similar stamp of horse but of a more powerful build, well bred though not necessarily shewing so much action and speed as the Horse Artillery animal.

For British Cavalry.—Well bred hunter or hackney-like horses from 15 to 15 hands 3 inches, possessing good shoulders and action with strong back, loins, and chest, large sized bone of joints and limbs, and able to carry a heavy weight, and to move rapidly under that weight over ordinary cross country ground.

For Native Cavalry.—Much the same stamp of horse as that described for British Cavalry, but of smaller dimensions and build, well bred, from 14 hands 1 inch to 15 hands 1 inch in height and possessing much activity.

6. It may be in all truth stated that the Indian Artillery and Cavalry are remarkably well horsed; indeed, it may be added that their horses will compare favorably, if not excel, the horses in any other army in the world, as being fit, and able to do their work in all extremes of climate, from the temperature of tropical heat to that of freezing point. They have been tested in late campaigns, and results justify the statement now recorded.

7. But the weak points of the remounting of the Indian Armies consist in the present system of importing the greater part of the horses from other countries above noted for the requirements of British Cavalry and Artillery, and Madras and Bombay Native Cavalry.

8. It is evident that for political reasons all the horses required for war purposes should be obtainable within Indian limits, and on financial and revenue grounds the money spent in purchasing the horses should be distributed among the agriculturists and horse breeders of India, and thus the encouraging, fostering, and developing of horse breeding as an agricultural industry would be in a marked and practical manner fully carried out.

9. The Bengal Stud Department which existed from 1794 to 1876 and the Bombay Stud Department, which was in force a few years (between 1830 and 1842, I believe) failed to supply the number and stamp of horses required for the Army, and the present Horse Breeding Department does not yield a sufficient number of horses for army wants beyond supplying an improved stamp for Bengal and Punjab Native Cavalry, and, as yet, only a few for British Cavalry and Artillery.

Vide Special Stud Commission Report, a copy of which is in the library of the U. S. Institution.

Vide revised Resumé of Horse Breeding Operations, corrected up to 1887, to be found in the library.

10. The principles laid down for the working of the Horse Breeding Department, when it was inaugurated in 1876, by the Imperial Government, were described by me in a paper I had the honour of reading at this Institution in May 1887.

11. Briefly, I will here recapitulate that the Government supplies the best stallions available, and of breeds considered suitable for country-bred mares, the property of argiculturists in the North-Western Provinces, Punjab and Bombay horse breeding districts. The mares have to be inspected by the Veterinary Surgeons, who form the *personnel* of the Department, and those mares approved are branded in proof of their being pronounced eligible for being mated with the Government sires. No covering fees are levied and no lien on the produce is held by Government; but the brand denotes that a promise is made by Government that the services of Government stallions shall be available for the mares, and the owners on their part agree to bring their branded mares to Government sires. In addition, the Imperial Government grant annually Rs. 20,000 in prizes at Horse Fairs and Shows for the best of stock got by Government stallions out of branded mares; and at some of these exhibitions additional awards are provided from monies locally subscribed.

12. Government purchase the produce in the open market like any ordinary buyer.

13. The result, after twelve years' experience of the working of the Department, is that the stamp generally of horse stock in Northern India has much improved, and the Bengal and Punjab Native Cavalry are now mounted on superior horses which have done work in a satisfactory manner; also that the few country-bred horses now in the ranks of the British Cavalry and Artillery are favorably reported on.

14. The numbers required for Native Cavalry, in Northern India, and Mounted Police are obtainable in the districts and markets; but the number purchased for British services are so limited as to necessitate the purchasing of Australian and Persian Gulf horses, as well as during the past year a few Cape horses, to remount those branches of the service.

15. It will be now as well to give the number of horses required on the average annually for the several services of the different Armies in India, and the numbers may be accepted in the aggregate, as follows:—

For Horse Artillery...	232
„ Field ditto...	248
„ British Cavalry...	462
„ Bengal and Punjab Native Cavalry...	1,200
„ Madras Native Cavalry	282
„ Bombay Native Cavalry	400
Total... ...	2,824

16. The requirements of remounts for the levies of Native States are not precisely known, but may be noted as considerable, inasmuch as agents from the States are to be found at every horse fair and show. Moreover, European and Native dealers are regular purchasers of horse stock at all ages, and at prices from the highest to the lowest figures of each, at all fairs and shows and in breeding districts. The animals so purchased are re-sold in all parts of India, at Calcutta, and in most large stations.

17. The demand is greater than the supply, and the improvement of the classes of the stock in Government breeding districts has caused Native States to seek for most of the horses they require in those districts, as horse breeding in their own States remains limited, and not equal to affording sufficient produce for their own wants.

18. The number of stallions allowed by the Imperial Government in Northern India is limited to 300, and the registered number of approved and branded mares was on the 31st March last 14,827.

19. In the Bombay Presidency there are at present 103 horse and pony stallions—59 horse, and 44 pony—and of branded mares 4,761 for horse and 5,212 for pony stallions. Of the branded mares in India, *viz.*, 19,588, it may be approximately taken one-half visit the stallions annually, and of these say one-half yield produce, thus it may be calculated that 4,184 young horse stock are born annually; and of these probably 600 do not reach maturity, so about 3,584 may be considered as the probable number of country-bred horse stock by Government stallions available in the annual Indian markets. Of these we have evidence that about 1,500 are purchased chiefly by the Native Cavalry of the Indian Army, leaving a balance of 2,084 absorbed by the Government Police, Native States and the general public.

20. As the supply is not found equal to the demand for the British Cavalry and Artillery, and Madras and Bombay Native Cavalry, the in-

ference is that there is ample room for the extension of horse breeding, and to effect this a greater number of sires and dams are required. The latter will probably become available in proportion to the number of sires at hand; and these should be of a class and stamp found by practical experience most suitable for producing useful stock, and of the kind that will realize a good price, *i. e.* a paying price to the breeder and rearer. If breeding be proved remunerative it will surely develop.

21. As the Government may be considered to be the largest purchaser in the market and, as a rule, but not always, may be said to give the highest prices, so will it be as well to briefly refer again to the description of the several kinds of horses above shown as required for the Army, and they may be summarily described as follows:—

For Horse Artillery, powerful, well bred, large jointed, good boned and limbed; to measure not less than 8 inches under the knee, from 15 hands to 16 hands one inch in height, able to carry 15 stone, and draw 6½ to 8½ cwts; to have good action and speed and to weigh from 8 to 10 cwts.

For Field Artillery and Ammunition columns, horses of a similar stamp and height as those required for Horse Artillery; but of greater power and larger bone, though not so active and speedy, and of weight from 9 to 10 cwts.

For British Cavalry, the hunter-like, cross-country horse type, well bred and with good action, powerful in back and loins, and large enough in bone of joints and leg to carry from 17 to 18 stone across country; in height to be from 15 hands to 15 hands 3 inches, to measure not less than 8 inches under the knee, and to be not less than 8½ cwts. in weight.

For Native Cavalry, of a similar class to that described for British Cavalry, and capable of similar work, carrying from 15 to 16 stone, to measure from 7½ to 8 inches under the knee; in height from 14 hands 1 inch upwards, and in weight from 7 to 8 cwts.

22. As we desire to obtain the above classes of Army horses from the indigenous and improved mares found in the Indian breeding districts, a description of these mares is requisite.

23. The majority of country-bred mares of India as marginally* noted, may be said to range in height from 13 hands 2 inches to 14 hands 2 inches, and some few are found as high as 15 hands; and in weight, from 6 to 8 cwts.

*Maharati.
Deccanni & Bhimtari.
Kathiawar.
Marwar.
Bikanir.
Meywar.
Punjabi.
Dhunni.
Hazara.
Sind.
Cutch.
Biluchistan.
Burma ponies.

24. They are as a rule remarkably well bred, rather light in barrel, not evenly put together, often of an angular and ragged appearance, with small but steel-like bone of joints and limbs, measuring from 6¼ to 7¼ inches under the knee, at the top of the shank bone. They have wonderful powers of endurance under either tropical sun-heat or intense cold with a light weight say from 10 to 12 stone in the saddle, or with a light draught; and after the hardest day's work are never off their feed, but always ready for it; moreover, they will continue doing work on the scantiest of food.

25. In the improved breeds obtained from these mares by Government sires, we have increased the size in bulk and given more bone of

limb, and greater weight carrying and draught power, and still we find the powers of endurance equal to Army service work.

26. We have therefore in the indigenous and improved mares a grand structure for engrafting more power and size. Indeed, we could not desire a more suitable basis to work on, in improving the breed so as to render the produce from it more generally suited for greater weight carrying and draught power.

27. The important question is how to carry out this alteration and development in conformation, size, and power, by a safe and practical mode of action; *i. e.*, we desire to obtain larger and more powerful stock from this undersized but in every other respect, as regards general utility work, high bred and lasting tropical horse stock.

28. Granted, if we kept the breed intact, by liberal feeding we could gradually obtain development in size and power; but this would require generations to effect, and more time to bring about the even conformation found associated with improved types.

29. The axiom that the sire has more influence in the production of outward conformation and limbs, and the mares in creating the vital organs of the produce is proved sound daily in horse and mule-breeding in India.

It may therefore be accepted that the using of sires, able to impart to the stock of country mares more substance and size without appreciable loss of enduring power is the only plan to adopt with the view of creating in India a larger and better bred and more powerful "general utility" horse.

30. This change in conformation of body and limb must not be expected in one or even two generations, but should be carried out gradually, by using at first a stallion not too large or weighty compared to the mare, and at every succeeding generation of enlarged mare stock, using horses of larger bulk. I am inclined to believe it better for the dam to be larger, more bulky than the sire, but I have to make recommendations how to act with dams smaller than the stallions.

31. In time, by judicious mating with development therefrom, we may in India secure dam stock of a size to allow of it being served by stallions of smaller dimentions. Again the stallions employed must be pure of breed, of good constitution, hardy, and devoid of hereditary diseases of limbs.

32. It will be interesting for us to refer to the stallions that have been employed in Government horse breeding in India for the last 94 years, and to trace the practical results of the using of each class of sire. Many of my hearers who are in the Artillery and Cavalry branches of the Army, and more especially the officers of the late Stud Department, or present Army Remount Department will be able to follow me in my description of the country-bred stock of each class of sire as of recent years found and now present in the regiments and batteries of the Indian Armies.

33. The imported and other breeds of sires employed since the inaugurating of Government Stud Establishment in 1794 have been:—

English Thorough-bred.
Arab.
Australian.
Cape.
Stud (Home Indian stud bred).
English Half-bred (Roadster "Shaw" & Norfolk Trotter).

34, Allow me to give a short description of the produce of each class noted, out of country-bred mares.

35. By thorough-bred English the stock is as a rule handsome in top and outlines of back, hind quarters, and carriage of head and tail, but is often shallow in girth and back rib, light in barrel, and from 70 to 80 per cent are leggy and deficient in bone of limb. Diseases of legs are more common among thorough-bred stock, *e. g.*, curb, bone spavin, bog spavin, and ring bone are not infrequently shown. Few of this stock prove fit for British Cavalry, and hardly one for Horse or Field Artillery; but some are purchased for Native Cavalry. Many Native breeders are distrustful of this class of sire, as they find their stock do not realise a good price in the market.

36. By Arab stallions the produce is smaller in height than that by the thorough-bred English, but is very pretty, having an even outline of back, loins, and hind quarters, with good barrel, and handsome carriage of head and tail; but the legs are often light under the knee, though of better, harder and more lasting material, and freer from disease than the stock of the thorough-bred. The small size of the produce by Arabs is the objection raised by breeders, dealers, and Army Remount Agents, and as this stock realize lower prices than larger stock so the Arab sire is more or less at a discount. Had the breeders large and broad 15-2 mares, and were these mated with true Arab horses, doubtless higher produce would be obtained, and then the Arab sire would become a favorite, for his hardness of constitution, steel-like limbs, and beauty of conformation are points generally acknowledged by all Asiatic horsemen.

37. By Australian sires, which as a rule have been thorough-breds, indeed thorough-bred English, bred and reared in Australia, the young stock prove often better boned in limb than the stock of imported thorough-breds from England; but in other points they are similar to the stock of the English thorough-breds.

38. It was suggested in 1885 that stallions, thorough-bred, but showing more substance of limb, and of better constitution might be obtained from Australia, and I accordingly addressed twelve of the leading breeders of that country by a Circular letter, in October of that year, on the subject, but received only one reply, and that from one of the most successful breeders as follows;—

"I shall have much pleasure in doing what I can for you in informing breeders of your requirements. I must, however, say at the outset that there are very few breeders who breed the description of horse you require, and who would care to export them for the money. We are in quest of the same kind of horse ourselves. The stallions mostly used, are those which have been on the turf. The good ones, fit to breed from, are worth £500 to £1,000, and those which might be got at your figure* would not be the sort you require, or, indeed, ones which it would not be judicious to breed from, they being mostly on the leg, and without substance. This is not saying much for our horses—but the fact is, breeding is such a hazard, the good ones are exceptions, and most breeders only breed for the turf.

*£250.

39. By Cape horses some stock has been obtained, but only a few Cape sires have been in the Indian studs. They have produced good wirey limbed stock, rather light in general build and limb, and not of sufficient size and power for general army requirements. At the present time no sires of this class are in the Horse Breeding Department.

40. By Stud-bred sires, *i. e.*, horses bred in India and reared by the late Stud Department, some good stock have been obtained, more especially from those with half-bred English blood in their veins; but those possessing chiefly thorough-bred and Arab blood have as a rule produced stock, light in bone and limb.

41. By half-bred English horses. Under this head are included the several classes named Roadsters, Hackney, and Norfolk Trotters, also some horses imported from England years ago, I believe of Yorkshire breed, and known in the late Stud Department as "*Shaws*" having been provided by a breeder or dealer of the name of Shaw. These several Half-breds have been said to be pure half-bred horses, not mongrels, as an immediate cross of the thorough-bred horse and cart mare, but the produce of a systematic course of breeding originating in the cross of these two breeds. The Yorkshire, Cleveland, Suffolk, Lincolnshire, and Norfolk horses are representatives of the results of this original cross, and these breeds are now acknowledged as separate and distinct, possessing pedigrees by which they prove that they are each of a distinct class and are thus pure half-breds.

42. The horses of these breeds that have lately been imported to India for Stud purposes have been chiefly Roadsters, and Norfolk Trotters; and these have, with country-bred mares, produced stock of good bone and power, proving suitable and sufficiently well bred for Army work in India.

43. I may mention that as a rule most of the best boned stock in the late Stud Department when inspected by the Special Stud Commission during the years 1872-76 had half-bred English blood in them :—more especially did some, not all, of the Shaw horses' progeny show more bone and general substance. The Special Stud Commissioners bore this fact in mind and advised the employing of more half-bred sires; these to be of pure breeds and showing quality. Some of the half-bred sires that had been imported from England were in the opinion of the Commissioners, of not sufficient quality; but they found their produce proving excellent for Artillery purposes. A recommendation of the Commissioners that a certain number of half-bred stallions, as well as thorough-breds, should be obtained and purchased by an officer having had experience in horse matters in India, was supported by the Government of India, and sanctioned by the Right Hon'ble the Secretary of State for India in Council, and Lieutenant-General A. R. Thornhill, who had been many years in India and was well known for

his sound judgment of horseflesh, as Joint Remount Agent in Bombay for the Governments of Madras and Bombay, was appointed purchaser of stallions for the Indian Government. This officer since 1876 has bought all the English-bred stallions sent to India, and I take this opportunity of recording my expressions of gratitude to him for having provided the Horse Beeding Department with the very good stallions we have received.

44. I of course do uot wish to imply that every stallion has proved a success, but I do most distinctly affirm that at least 90 per cent of the half-bred sires have fully realised the expectations formed of them. These horses were for several years considered by horsemen in India, accustomed only to thorough-bred, Arab, and country-bred stock, too coarse and unfit for the purpose of improving the breed of the horses in India. Some persons have declared them to be cart horses; but such an opinion could only emanate from minds biassed against the breed, or ignorant, from a lengthened and probably continuous residence in India, of horse breeding as now obtaining in Great Britain, Ireland, and the Continent of Europe. Again these horses have been called Belgian, Flemish, &c.; but as they have been mostly bred and reared in Norfolk, where their sires and dams of pure Norfold blood can be seen, and as from the produce of these, the Norfolk Trotters sent to India have been selected by General Thornhill, we can but accept them as Norfolk horses.

45. We are aware that most Englishmen from their love of horses, consider they have, and doubtless do possess a right to hold and deliver opinions regarding horse flesh, and on this fact rests, no doubt, the diversity of opinion obtaining on the subject, as each lover of a horse has his or her particular class or type of horse to love. It is amusing to hear opinions passed by judges of horses when they are inspecting the Government stallions.

46. The Cavalry Officer, when looking at a handsome Thorough-bred, declares that breed to be the right one for Indian Stud work. The Artillery Officer exclaims when looking at an active well boned Trotter, "Ah! this is the horse in my opinion suited for producing good Army horses for India." A lady who has been admiring a very pretty Arab horse, ejaculates, "What a dear, truly lovely."

47. But the Government of India are desirous of obtaining a sufficient number of really good Army horses bred and reared in India, and capable of doing good work by having blood, bone, and power to enable them to carry and draw the heavy weights of British Cavalry and Artillery, in all vicissitudes of climate. The practical results of horse breeding that have obtained and are obtaining in India indicate that such horses cannot be produced from the present country-bred mares by mating them with thorough bred or Arab stock, and that very few per cent of remounts so bred prove fit for those branches of the service; but we are having day by day more proof that the produce of these mares by Half-bred English horses (or as they are now called in England, Hackneys) of pure breed, is well adapted for general army work in India, thus indicating that the more this class of sire, *the well-bred Half-bred*

is employed, the greater chance will be afforded of securing larger framed country-bred brood stock which will yield still larger framed and boned produce, and the mares of this improved and developed stock may in time become large enough in bulk to allow of their being mated to Arab sires, should it be deemed desirable to add more quality, and compactness in bone, with powers of endurance, which are the well known characteristics of the true Arab.

48. I do not mean the Persian Gulf Arab, the cross between the Arab and Persian which has been, during the last 35 years, bred to meet the wishes of Indian Cavalry Officers, who gain in this cross the addition of one or two inches in height at the expense of a certain amount of steel-like bone, and tough ligaments and tendons.

49. It therefore becomes evident that the above lines based upon practical results are sound and should be adopted in horse breeding in India. It is apparent likewise from results both in the late Stud Department, and in the present Horse Breeding Department, that the thorough-bred English and Arab horses are not the sires to mate with country-bred mares, as most of the produce prove generally leggy, light in barrel, and too light in limb, for general Army purposes.

50. Doubtless the stock is pretty, and shows great quality, and as a rule has speed, but the latter only when carrying light weights over short distances. But this is not the type of horse wanted for the Indian Army.

51. My experience with regard to the employment of thorough-bred and Arab stallions in India commenced 26 years ago, when Superintendent of the Stud Department in the Bombay Presidency, and then I believed it right to use these breeds of sires for the mares of the country. I have now to confess that on visiting, 3 years ago, one of the best breeding districts in the Bombay Presidency, and attending an annual horse show held there, I found the stock resulting from the use of these sires, though very handsome in top, and pretty in carriage of head and tail, lamentably deficient in bone and sinew of limb, leggy, and wanting in girth. The director of the Army Remount Department was present at the Show in the hope of finding remounts, but he did not succeed in seeing one fit for the British service; I believe that not one country-bred remount for the British services has been secured as yet in the Bombay Presidency. May I therefore ask you to remember that thorough-bred and Arab stallions have brought about this result.

52. Bear with me while I remind you that the English-bred of to-day is generally acknowledged to be, when compared to the thorough-bred of a century ago, an animal deteriorated in constitution and in limb, and as a rule only fit for the purposes for which he has of late years been mostly used, *viz.*, to carry light weights at a tremendous speed over short distances, often measured only in furlongs. Again, the pampered life in which the thorough-bred has been bred and reared for a century or more, does not add to his fitness to become a sire of animals to be used for hard work over long distances and on scant commons.

53. The Arab by his breeding, life and history, is by far better qualified to impart blood, toughness of sinew, compactness of bone,

hardiness of constitution, and powers of endurance even on the shortest of forage, than any other sire. His size is his only weak point, as an Army horse; but when a really hard campaign ever comes off, and but little grain or forage is to be had, the cavalry mounted on horses possessing Arab and country-bred blood will be found to posses the most enduring war horses, and ones which are more suited than any other breeds for tough work.

54. Still as the demand for Army horses of greater size, bulk, power, and weight is made on account of there being heavier men to carry, and guns to pull, the lines I have indicated for producing a larger type of horse will I believe be found sound and successful

55. We should, I believe, rely on the pure half-bred of England as a sire, to give more bone and substance to our stock.

56. But if better stallions possessing these qualifications, and of a pure breed, can be obtained in any other country, most certainly they should be secured for India.

57. Again referring to thorough-breds let me mention that they are not used *per se* in England to produce anything but race horses, or horses for light weight carrying purposes. But the thorough-bred in England is now being employed by mating him with half-bred or even light cart mares to produce useful horses. I would invite your attention to two pamphlets written by Mr. Walter Gilbey, the one "Riding and driving horses, their breeding and rearing, March 1885." The other "Suggestions upon horse breeding, 1886." Both published by Vinton & Co., No. 9 New Bridge Street, Ludgate Circus, London, E C.

58. Mr Gilbey ranks as one of the most successful breeders in England, and I believe a perusal of his most interesting papers will convince you that he writes on a subject that he is practically acquainted with.

59. I would also suggest that all interested in horse breeding in India should read the following books on the subject:—

"Moorcroft's observations on the breeding of horses within the provinces under the Bengal Establishment, by William Moorcroft, Superintendent of the Honorable Company's Stud," written about the year 1815.

"Report of the Stud Committee, Bengal, 1869" of which Major-General Colin Troup, C.B., was the President.

"Final Report of the Special Stud Commission, Bengal," 1876.

"Government Horse Breeding in India, past, present and future."—A paper I read at a meeting of this Institution on the 6th May 1887.

The above books will be found in the library of the U. S. Institution.

68. In conclusion let me assure His Excellency Sir Frederick Roberts who has so very kindly occupied the chair on the present occasion, and all you gentlemen, that no man loves the high bred horse more than I do. No man values blood, and enduring powers more than I do. Many dear friends and companions in the hunting field I have had, and and still have in India, who know well that I am generally to be seen when hog hunting, on an Arab, or half-bred Arab country bred, as from their blood, powers of endurance and steel-like quality of limbs, I know they

are, though small in stature, well able to carry me safely and will last under my heavy riding weight of 14 to 15 stone during a long day, under a tropical sun.

61. One word more, pray do not go away with the idea that I mean there are no good thorough-breds; I speak of the thorough-bred as now-a-days generally obtainable; not of the few exceptionally grand horses whose names may be found in the Stud Book.

62. In order to obtain stouter and better boned thorough-bred horses, racing weights and distances must be increased to those in vogue a hundred years ago.

THE HIGHER EDUCATION OF OUR NON-COMMISSIONED OFFICERS.

By Captain F. W. Kitchener, West Yorkshire Regiment.

The cutting down of our drill book.

The cutting down of our drill book following close upon Colonel Maurice's lecture on drill at the R. U. S. I. has been met in this country in anything but a friendly spirit, and various opinions have been ventilated in the press, all more or less hostile to the principle involved.

Colonel Maurice's lectures at the R. U. S. I.

Colonel Maurice in his lecture deprecates our system of drill in so far as the drill on the square is the outward and visible sign of an obsolete and bygone principle. He contends that all our training should be based upon the principle of preparing men for the positions they are likely to find themselves in before an enemy.

General object of this lecture to direct attention to training of N. C. Officers.

It is not my object to go over the ground so ably disposed of by Colonel Maurice, but to direct attention to the training of our non-commissioned officers, and to submit for discussion the general principles on which this important subject should be based, with a view to fit them for the positions they are likely to find themselves placed in, during a campaign or in battle.

Sufficiently good men forthcoming for N. C. Officers.

Ever since the introduction of the short service system, the supply of efficient non-commissioned officers has been one of the most knotty points that our military administrators have had to deal with ; by judicious modifications of the term of service and by improving the position of our subordinate ranks, a very fair solution of the problem has been arrived at, and though it can hardly be said there is any competition for lance rank, still sufficiently good men are found to take the stripe to supply a very fine and reliable body of Sergeants.

Question for discussion. Does our training of N. C. Officers meet the requirements ?

The question which now arises and which I wish to submit for discussion at this meeting, is how do we work up this raw material for fighting purposes—Is our system of instruction the best to develope those qualities essential to success in a modern battle ?

Care necessary in approaching the subject.

The first step towards a solution of this problem, will be to ascertain what are the essential qualities required in a non-commissioned officer. This is no light matter to be dealt with in a few pages, but one that goes to the foundation of tactics and requires the most careful analysis. Let us remember Darwin's illustration of how the number of cats in a district would effect the number and welfare of the bumblebees ; and let us at least follow that great philosopher in one point and avoid laying down any rules on theory alone. If an extra litter of kittens may mean the destruction of the humble family of bumblebees, surely some equally unforeseen influence may upset any purely theoretical view of such an extremely abstruse a subject, as the essential of a modern non-commissioned officer.

The origin of barrack square drill and the developement of modern minor tactics.

I will as briefly as possible sketch the origin of our present barrack square drill system and the development of modern minor tactics.—When the father of Frederick the Great devoted himself to perfecting his army in showy evolutions, the requirements of a non-commissioned officer were of no mean order. The precision with which these movements were executed required the greatest nicety in leading and in estimating distances, and the drill-corporal's art in "*forming men*" was brought to perfection ; it was in fact an art requiring years of application and a special aptitude.

The old King was so devoted to his toy that he could not bear to use it for any thing so rough as war, and it was not until his son had succeeded to the throne that this long peace training was subjected to the crucial test.

The battle of Molwitz.*

War in those days, for many reasons, was not carried out with any undue haste, and it is not surprising that Frederick began his military career by surprising the Austrians in their cantonments : but so cumbersome was the machinery for bringing his troops into fighting formation, that three hours elapsed before the battle could be commenced, and in the meantime the Austrians had been able to draw up to receive the onset. But, in spite of delays the "Drill Corporal" won the day. When the two lines had been carefully drawn up, the artillery opened fire at some 1,500 yards and the infantry lines gradually closed upon one another. The cavalry on the flanks charged and Frederick's cavalry was driven from the field. The peace training of the "Drill Corporal" now began to show itself. In spite of cavalry charges the infantry bore on, redoubling their fire as they approached the Austrians and making the best use of their superior armament.† The enemy's line already showed signs of wavering when the Prussians levelled their bayonets for the charge that was to sweep them from the field.

Frederick can have had little fault to find with the principle on which the peace training of his infantry had been conducted when the messenger found him far from the field to announce this his first victory.

Improvements introduced by Frederick the Great after Molwitz

But Frederick was not content to rest on his oars. In the 14 years of peace that followed his first Silesian war he made many improvements in his army, all with a view to mobility. It was at this time that he introduced the formation of open column of companies, by which he was enabled to move his army rapidly into position, without fear of the falling into disorder on rough ground and by which he was able at any time to wheel into line for battle. A glance at these plans will be sufficient explanation of the general principle.

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*Lecture by Lieut -Colonel C. C. Chesney, vol. xv. R. U. S. I.

† Steel ramrods

Their application throughout Europe.

The seven years war which closed in 1763 proved to Europe the value of this new system and every army adopted it. This was the commencement of our *Barrack square* system of to-day or rather, since the recent weeding of the drill book, it would be more correct to say, of yesterday; the careful "*setting up*" of the recruit, the methodical destruction of individuality in the soldier, were all systematically arranged and brought to perfection with this end in view—*precision in forming line, the essential for successful battle.*

There can be little doubt that the system, as introduced into our army, was one peculiarly suited to our national instincts, and the following incident in the battle of Waterloo shows that our application of the Prussian principle was no servile copy of the original; but the grafting of the essential elements of the system on to an improved stock.

Incident in the grand attack on Wellington's left at the battle of Waterloo,

During the progress of the contest round Hougoumont, Ney had been occupied in making his preparatory dispositions for carrying into execution Napoleon's intended grand attack upon the centre and left of the Anglo-Allied line. For this purpose d'Erlon's four divisions of Infantry were formed into massive divisional columns, and 74 guns were posted on a well defined spur some 800 yards from Wellington's position, to cover their advance. As these 16,000 men advanced across the low ground separating the contending armies, the artillery fired over their heads and succeeded so successfully in shaking the Belgian two deep line, drawn up to resist the attack, that no sooner had the French skirmishers, covering the advance of the central and right columns, opened fire, than the whole line, simultaneously and as if by word of command, turned and fled. Picton's division 3000 strong, that had suffered so severely at Quartre Bras on the 16th, was in support, in column; and at once deployed to receive the shock.

There were no supports to this thin red line, but the Scots Greys had been ordered to some low ground in their rear for the sake of cover from the artillery fire.

Picton's right Brigade charged the French column in its immediate front and overthrew it, but the remaining two columns bore steadily on and, with shouts of triumph, reached the crest of the ridge and crossed the Wavre road.

The advance of the right brigade had left a gap between it and the Highlanders on the left; thus one of the French columns met with no opposition in front while the 92nd, (only 230 strong), the left of the Highlanders, alone confronted the remaining column. The Brigadier, General Pack, was in front of the 92nd and immediately gave the order "92nd you must charge." As the 92nd advanced, they were met by file firing from the leading ranks of the column; but without stopping to reply to it, they pushed steadily on to within 20 or 30 yards distance, and pouring in a destructive fire, charged. At this very moment the cavalry brigade under Ponsonby arrived the Scots Greys coming up the reverse slope in rear of the Royal Scots and 42nd. Wheeling back their companies, these two regiments allowed the Dragoons to pass through the line and reforming, they charged down the hill behind the cavalry with shouts of "Scotland for ever." *

In this incident we see the perfection of barrack square drill, applied in battle where the circumstances were favorable to success. It in fact enlisted all the battle qualities of the men, at the same time that it allowed the best use of their arms.

That Napoleon †failed, as I have shewn, against our line at Waterloo is explained by saying his troops had not had sufficient training, to act on the lines of his Army of Italy.

But this can hardly be taken as sufficient reason when we consider the repeated success of our liniar tactics in the Peninsular. The fact was that in applying the Prussian system we had not blindly followed, but had developed an improved system suitable to our national instincts and the weapons in use. For some years now we have again copied the Prussian system ; let us then see if we cannot again develope an improved copy, suitable to our more highly educated recruits, by turning the restless desire to use an improved intelligence, to use for battle.

The Battle of the Alma.

At the battle of the Alma, where our men were armed with rifles for the first time in war, they attacked the Russian position in two deployed lines ; the front of the first line extending two miles.

"In this formation they had to cross a river with steep banks and to ascend a rocky slope, in close proximity to a burning village and among enclosed vineyards. Opposed to the English stood, at the least, two thirds of the Russian force. As soon as the first line had ascended the opposite bank, they formed an irregular chain of skirmishers, in which the men of not only different companies, but even of different regiments, got so mixed up together, that it became no longer possible to fire volleys or make any regular movements.

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* Siborne 3rd Ed. p. 261.

†As early as 1776 a new development had commenced and the system of attacking in small columns covered by skirmishers had begun to be taught in France Thus when Napoleon, in 1796, took command of the Army of Italy he found this more elastic system in practice ; and owing to the republican ideas then in vogue and the effect of 4 or 5 years harassing mountain warfare, together with the little professional kuowledge of the subordinate commanders, who were mostly drawn from the ranks, a loose order of attack and an individual independence in skirmishing obtained, that was new. The large sprinkling of educated men forced into the ranks by the conscription, gave the required intelligence in the lower ranks for the successful application of this higher order of fighting.

Napoleon's proclamation to the Army of Italy, on assuming command, is interesting as showing how he encouraged individual cupidity, and trusted to the intelligence and self resource of a band of robbers, rather than to the power of discipline and a well ordered army.

"Soldiers" he said "you are hungry and nearly naked. The Government owes you much ; it can do nothing for you. Your patience and courage do you honour, but cannot procure you either profit or glory, I am come to lead you into the most fertile plains in the world. There you will find rich provinces and great towns. There you will find glory, honour and *riches*. Soldiers of Italy, can your courage fail you ?"

The Russian army formed into columns, composed of several battalions one behind the other, and advanced with an imposing and resolute bearing, but without firing. The thin, weak-looking, line of the English held its ground and directed its fire on this dense mass, at a range at which bullets could not fail to take effect.

Before they could come to close quarters or deploy, so as to deliver their own fire, the attacking columns halted and a few badly aimed shots were fired. For a short time the column stood firm ; soon, however, it lost its wall-like appearance, and becoming more of the form of an irregular cloud, at length gave way, slowly and unwillingly.

In these ever-recurring encounters of column against line, the Russians lost, in barely three hours, 5,700 men or nearly one-fifth of their whole force. The English advancing in line, and keeping up their fire, twice broke into the principal intrenchment of the Russians, which was defended by 16 guns."*

Individual nature of fighting at the Alma

I have introduced this instance, to show that our troops at the Alma fought in the loose order which is favorable for the developement of that individual action of subordinate officers suitable to their superior attainments. The 1,001 instances of heroism and readiness of resource recorded, prove that this individual action of subordinate commanders, was the soul and spirit of our attack.† This is the more remarkable, when we remember, that the troops had had little experience with the rifle, which had only been issued on the outbreak of war; and the superior officers were in no way inclined to relax the rigidity of Peninsular days.‡ It is but the first proof, of how the advance of intelligence, backed by improved firearms, is as irresistible a force as the expansion of metals under heat.

The American war of 1861-64, owing to the difficult and closely wooded country, as well as to the high standard of intelligence and the lack of military training throughout the hastily raised armies, was characterized by the employment of swarms of skirmishers, and by great individual intelligence in making every use of artificial cover. But though the individual nature of the fighting is so remarkable, there is one other element that comes out very strongly ; and that is, the moral effect on the troops of their appreciation of the operations going on.

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* Moltke. trans. by Crawford and quoted by Home in his Précis M. T.

† The stories of individual prowess on the part of our troops and officers would fill a volume * * * in fact the ancedotes of this kind are innumerable, and seem to have occurred all over the field,

W. H. Russell. Letter to "The Times". Heights of the Alma 22 Sep.

‡ The Light Division has had a great boon extended to it, stocks are not to be used on the line of march. I hear one Brigadier objects to this innovation * * There is no alteration in the use of the razor in this division. Camp Aladyn, June 20 1854—p, 97. Times correspondent.

Lord Raglan has issued the following memorandum ;—

The Commander-in-Chief has noticed with great regret the very unbecoming manner in which the officers of the army dress themselves * * * The shell jacket is allowed to fly open, showing underneath a red flannel shirt, with nothing round the neck, not even a white shirt collar * * p, 117.

The Duke consulted Lord Raglan and it is understood that his Lordship signifies his decision to be, that if moustaches are worn he will take no notice of it, but that chins must be kept clean...... p, 118.

After the three days fighting in the Wilderness in May 1864, Grant who was then unknown to the army of the Potomac, determined to draw Lee from his entrenchments, by a flank movement threatening the latter's line of communications with Richmond. The movement commenced at night.—*" The men, however, soon discovered that Grant was passing and that his face was turned towards Richmond, and although the orders for the march had not been made public, with the quick perceptions of veterans, they at once divined what this midnight ride of the general-in-chief must mean. They were not to retreat across the Rapidan, as had happened so often before. The word was passed from man to man, " Grant is moving to Richmond ;" and all along the road they rose spontaneously, and weary, stiff, sore and wounded as they were, they made the defiles of the Wilderness echo with their cheers. Their chief was almost unseen in the darkness and to most of them his features would have been unfamiliar, if they could have been discerned." And this, be it remembered, was not after victory, but after three days of the hardest fighting the army of the Potomac ever experienced, and which had resulted in nothing but bloodshed. So little could they flatter themselves on having defeated the enemy, that Lee's men hearing the shouts and thinking it a night attack, opened fire from their works.

It was not until Prussia entered upon her career of conquest, and after every campaign developed the lessons taught in the school of war, that the individual intelligence of the rank and file became the backbone of modern tactics.

In 1864, the short campaign against Denmark, though a one-sided affair from the first, taught many important lessons that were still further emphasized in 1866.†

In the interval between 1866 and 1870 the Prussians elaborated, with much care, and after many experiments, a new drill book which recognised the necessity of substituting " fire tactics " for " shock tactics."

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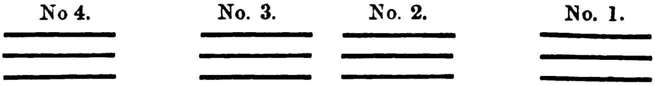
* Military History of U. S. Grant, p. 134, Vol, II,

† Les attaques se font le plus souvent, en colonnes de compagnie, avec des tirailleurs dans les intervalles ; mais quand l'ennemi est en force, et qu'un grand coup est nécessaire, chaque *bataillon* se forme en colonne d'attaque, et la ligne, entière marche ainsi à l'ennemi, drapeaux déployés, au son de la musique et des tambours. Entre plusieurs exemples de mouvements de ce genre, exécutés avec plein succès, nous citerons l'attaque de la brigade Wittich à Skalitz, et celle de la 14e division, près de Problus, contre l'armée saxonne.—*Conférence sur la tactique de l'infanterie prussienne pendant la campagne de* 1866.



Nous avons parlé de belles marches offensives exécutées par des lignes de bataillons entiers, et ayant amené de très-brillants résultats. Mais ces exemples sont rares ; partout ailleurs le combat partiel a prédominé ; chaque compagnie (sauf au 5e corps) s'est battue pour son compte, *tout en tendant vers le même but tactique, et sans attendre d'ordre supérieur.—Ibid.*

This was the first official recognition of the basis of modern minor tactics. The gradual growth had at last come to a well formed bud which was about to bloom forth in the bloody atmosphere of battle.

It was deemed inadvisable to introduce a new book at the outset of a war and the old order stood ; still the question had been so thoroughly gone into by most battalion commanders, that we see the new *régime* introduced, in many instances, even in the first battles of the war. I will merely allude to one of those instances, to show that the N. C. O. in modern war must be ready to grasp the situation in which he finds himself ; and to show that self-reliance, that can initiate a change in the direction of an attack at a critical moment, and give him that moral ascendancy over his men which can alone insure control of fire amidst the din of battle, is essentially necessary.

On the 4th August the III German army, moving by three different routes, advanced to the French frontier. The road on the right led through the little frontier town of Weissenburg which proved to be strongly held by the French, and the leading troops at once attacked the position. The advance guard of the central column, under Colonel Rex, soon came up on the left and joined in the attack. The French not only held the little town in the valley, but their right extended along the heights to the south of the town. Colonel Rex, sending one battalion along the straight avenue of poplars, directed two companies of the 58th and a rifle company to the left, where a French battery was well posted. At the same time a Prussian battery on the opposite hill turned its fire in that direction and obliged the French gunners to shift their ground in such haste that one gun was left behind.—" In order to prevent the rifle company from capturing the gun, half a French company opened a brisk fire, while the artillerymen hastened up with six fresh horses to save it. Sergeant-Major Meyer, however, succeeded in bringing his men close up and opening a sudden fire on the enemy's flank. The riflemen then dashed forward with fixed bayonets, and took possession of the gun. The near approach of support from the company, rendered all attempts to re-capture it futile."*

The effect of the modern development of tactics on the rôle of the N. C. Officer.

I have tried to show, how the development of modern tactics has altered the situation that a non-commissioned officer will find himself thrown into in battle, and what far higher qualities are now likely to be called upon at the critical moment. The more we examine the question in detail, the more evident it becomes, that whereas formerly a machine of great perfection was the end of all military teaching, now-a-days we require a highly-educated, self-reliant man, full of resource and capable of accepting responsibility.†

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* Page 131 O. A.

† Boguslawski says (page 85 of the Tactical Deductions of the 1870 war) " From the first action of the campaign at Weissenburg, until the end, the fights for localities were more frequent and more desperate than in 1866.

These fights for localities happened necessarily often because skirmishing tactics attained a greater development in this war than they have ever done before, which tactics entail the necessity of taking every advantage of ground, great and small.

We saw great deployments of skirmishers on both sides, long continued gradually advancing musketry fights, often rolling backwards and forwards ; at last

Changes in Tactics not only due to improvement in firearms but also to a change in the men handling them.

If we consider this gradual growth from mechanical precision to individual initiative, it will be seen that not only have the changes in armament altered tactics, but that the almost universal introduction of elementary education, and the consequent intellectual development of the raw material, from which the ranks are filled, has dictated a corresponding change.

Nothing would be more fallacious than to try and draw a line between these two factors, for they work hand in hand; but if either is neglected the test of war will enforce attention to it in no pleasant manner. It would have been as hopeless to expect the independent action of Sergeant-Major Meyer from a N. C. O. in Blucher's army at Ligny, as it would have been inopportune. But when, in 1866, experience in the field proved that shock tactics were no longer appropriate, the intellectual advance of the nation furnished the necessary power to render the introduction of the individual system possible; and when the Franco-German war broke out this intellectual advance of the nation had been developed as a military power.*

As men are taught to use their arms so they should be taught to use their brains.

It is obvious, that the advance of scientific appliances for war, must go hand in hand with the intellectual advance of the nation and of our recruits; it should be equally clear to us, that as we train men to use the improved weapons in their hands, so we must train them to use the improved brains in their heads.†

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the flank of one party turned on one side, exhausted, the other side pressing on in consequence, or a rush of dense clouds of skirmishers who endeavour at any price to dislodge their opponent, not forgetting that in case of failure or retreat they are dead men.

The German drill book 1876 (ch. xvii) says of the skirmisher—He must have decision, bodily and mental advantages, with skill in the use of the rifle.

And again, that skirmishers must not only know their rifles and be active, but have also power of discernment and self-reliance, without which they cannot play their proper part on service.

Colonel Home says—

The first troops that come into contact with one another before battles are fought, are small detachments. Military history necessarily passes over much that is done by these small bodies; but there can be no doubt that the correct leading and handling of these small bodies, conduces greatly to bringing the action of larger bodies to a successful conclusion.—*Précis of Modern Tactics.*

* If I maintained in my second letter that it was not the Prussian schoolmaster but the Prussian N. C. O. who had gained our victories, further consideration now leads to the assertion that it was neither the Prussian schoolmaster nor the N. C. O, but the Lieutenant who gained the day for us. *Not but what this same Lieutenant is in peace one of the soldier's schoolmasters* * * * Hardly is dinner over when the lecture time begins, and it is the business of some of the Lieutenants to give theoretical instruction to the N. C. Officers, of others to instruct the privates. This branch of instruction is positively necessary, especially in military matters, to which, however, the instructor does not confine himself entirely; on the contrary he *teaches his men many things which are afterwards useful to them in civil life* —Militarische Brief II. Ueber Infanterie by Prince Kraft Hohenlohe Ingelfingen R. U S. I. xxix.

† Though many look on *converting soldiers into machines* as a preparation for our next war the intelligent man will look for it more by fostering their *individuality* and *initiative.*—Lieut. Field Marshal Archduke John.

So far, I think, most soldiers present will give their ready consent; but I fear in passing to the next part of my subject I shall be treading on more dangerous ground; I trust that those present will express their views with the object of approaching some solution of the question. It has been stated that no good comes from lectures delivered at this Institution and I think this must be attributed, if true, to a lack of discussion of the subject in hand. A lecturer is bound to take a more or less one-sided view of his subject and it is only by a lively discussion that any good can be expected.

N. C. O. Schools not recommended.

The system of supplying non-commissioned officers, as such, direct from special schools is one that cannot be practically applied by the Indian Government and it has so many disadvantages that I shall not waste time by alluding to it.

N. C. O. must be drawn from the ranks

The British non-commisioned officer must be drawn from the ranks. It is during this first year or so in the ranks that he must learn the discipline that he will be called upon hereafter to uphold. As with a plant so with the budding non-commissioned officer; this preliminary germination as it the were, is the most important part of his development and on it depends the symmetry of the full grown tree. At present the Lance Corporal is, to my mind, the hardest worked man in the army, and many are unable to stand the strain of this preliminary stage; the falling back of these men into the ranks is the more to be deplored, as the system by no means fosters the survival of the fittest. I would therefore advocate a careful distribution of barrack duties with a view to lighten the work for Lance Corporals, and a more thorough application of selection for promotion.

"His duties commence at reveille, 5-30 A M.—Immediately after reveille he will assist the orderly Sergeant in causing the men to rise. See the urine tubs emptied, filled with clean water, and deposited in the place appointed for them. 6 A M—Parade the defaulters, render the report to the defaulter Sergeant, and answer for all men on duty etc. 6-30 A.M.—Collect the names of all men reporting themselves sick and make out company sick report. 7 A.M.—See that the cleaning things, and all articles of clothing are sent to the prisoners in the guard room, and see that they are removed when no longer required 7-45 A.M.—Parade the ration carriers, with meals for the men on guard, and march them on to the square, to be there 10 minutes ofter the 1st bugle sounds. 8-30 A.M. Parade defaulters, and hand in sick report. 9 A M—Take documents requiring signature of Officer Commanding Company, afterwards leave them in the various offices, etc. 9-30 A.M.—Letters as a rule are issued, the O. Corporals attending on the bugle call to receive company letters (including officers) and distribute them to the men of their company (including men in hospital). 10 30 A.M—Attend on bugle call sounding to receive the names of men admitted to or discharged from hospital, acquaint the Color Sergeant with all alterations, get the ration return from him and take it to the Quarter Masters office. 11-30 A.M.—Enter in grocery book the quantity of groceries required, after showing it to the Color Sergeant leave it in the canteen before 12 noon. 11-45 A.M—Parade defaulters for drill. 12-45 P M.—As at 7-45 A. M. 1-30 to 2-30 P.M.—Take the men awarded imprisonment to cells and hand them over to the Provost Sergeant. See clothes of men discharged from Hospital taken to Hospital 3-30 P.M.—Parade the men for drawing rations, attend during the issue, report to the orderly officer that each mess has received its proper allowance. 4-45 P.M.—As at 7-45 A.M. 7 P M.—Show Regimental orders to Company Officers (sometimes no light duty when the officer lives out of barracks). Tattoo (1st post) assist orderly Sergeant to call roll. Tattoo (last post) Attend on parade ground with the Orderly Sergeant to answer for the Company. In addition to the foregoing the following little things have to be done. Be present at all times when the roll is called by the Orderly Sergeant. Attend certain parades for drill purposes. Assist the Orderly Sergeant in taking an inventory of all men"absent", make out a sick report at any hour of the day or *night* for any man reporting himself sick and *take* him to Hospital; run about for any thing the Orderly Sergeant may require, ditto, Color Sergeant; with *some* Orderly and Color Sergeants I sometimes have pitied the poor Orderly Corporal When O. C. myself in Plymouth I had sometimes to go without breakfast owing to the work being so heavy just about from reveillé to 10 A.M Another unpleasant duty occurs when calling the roll at Tattoo. The Orderly Sergeant simply says "confine that man" or "those men" and walks on to the next room (no time to spare having only 30 minutes) when the young O. C. of a week's standing has to confine a drunken insubordinate man, or two perhaps. The work in this country is nothing compared to that at home. The Orderly man out here does most of the running about for the Color and Orderly Sergeants and goes with the company documents.

T. Wilson, *Sergt.-Major,*
West York Regiment.

Drill has little effect in developing discipline beyond the barrack square.

No one will contend that our recruits are over drilled, or that their individuality is likely to be impaired by the few hours parade work expected from them; but unless drill destroys individuality and capabality for independent action, it has little power in developing discipline, beyond the barrack square.

The source of discipline in respect for higher attainments.

Discipline,* as I understand it, means the *willing* subordination of will to the orders of a superior. Now drill, meaning thereby certain evolutions requiring a physical skill in their execution, cannot develope this required higher discipline. To find its true source, we must turn to the social relation between N. C. O. and private.

To drop theory and to turn to experience.

Discipline, based upon the higher education of N. C. Officers.

My regiment was one of the first of the very young regiments that came to this country and our discipline was very bad. By great good luck, we happened to be commanded by a man of the foremost rank of great soldiers: recognising the impossibility of maintaining discipline on the old lines, with sergeants of only a few months service, he devoted himself to new methods. By introducing a higher system of theoretical training for non-commissioned officers, he was able to instil that self-confidence and feeling of power into sergeants of a few months service that enabled them to exercise a far greater moral influence over their men than they could have otherwise. Tests for promotion were introduced in tactics, field fortifications &c., and for the application of this theoretical teaching, 'company training,' very much as now authorized, was practised.

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* The Captain is very rarely called upon to perform great tactical or strategical operations on service. His objective whether he be on the offensive or defensive is in general very clearly marked out for him, but his own immediate share in the action is successful or not according to the manner in which he carries out his instructions, and to the way in which his men take advantage of ground, to their skill and steadiness in firing, to their attention to all signals and orders; *for the more the fate of battles depends upon the independent action of the individual the greater is the demand upon discip'ine, that is to say, upon ready obedience.*—Prince Hohenlohe-Ingelfingen.

Company taining to be supplemented by theoretical teaching for N. C. Officers that they may gain a moral power over the men by becoming assistant teachers in place of assistant learners.

Company training has, no doubt, done an immense amount to improve the efficiency of our army; but little has been done to ensure that theoretical training of the non-commissioned officers that is necessary, to enable them to take that position during company training, that can alone give them the required moral ascendency over the soldier, which is the essence of the system of discipline that I have alluded to.

The welfare of the soldier a central principle in developing higher discipline.

There is one other central principle in this system of discipline; *viz.*—to improve the soldier's surroundings.* So much has been done of late and the question is being taken so thoroughly in hand, that there is no necessity for me to do more than to point out its importance in developing that "willing subordination of will" that we require from our non-commissioned officers in modern battle.

"Public opinion" as a battle force.

The most striking national feature of the age, has been the development of the force known as '*public opinion.*' Now if we analyse this force, we shall find that the effect of universal elementary education has been to awaken an overwhelming zeal for information; and a class of men have arisen termed 'agitators,' who, taking advantage of this thirst for knowledge, turn it to their own ends. It was the neglect of this great national development, that resulted in the Conservative defeat in 85, and the acknowledgement of it and the organization of the Primrose League to meet it, that resulted in the subsequent Conservative victories. Now we see this same force in our midst in the zeal displayed for Temperance, Good Templar and other societies. What I wish to point out is that we should recognise this national characteristic and turn it to war purposes; not as agitators turn it to their own use by exaggerated and feverish pictures of imaginary perfection; but as the Primrose League has, by properly organized instruction. Then indeed, we shall have some basis on which to trust for victory, though numbers may be against us; then we shall have some reason in saying—"*as in time past our battle tactics were a match for the foreigner and his superior numbers; so in the future will victory follow our arms.*"

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* The comfort of the soldiers' barrack-room has not been sufficiently considered. * * * The standard of home comfort throughout the country from which we should like to obtain our recruits has risen considerably. Great improvements too have been made in all public institutions. We want to get a self-respecting class of men into the service, and when we have got them we want to keep them. Let us level up our standard of comfort and we shall go a long way to success.

Lt. Col. J. McD. Moody, R. U. S. I, Vol. xxix, The main results to be looked for from the higher education of the N. C. O.

Then from the higher education of our non-commissioned officers I look for two main results—1st. Discipline and moral ascendency over the men. 2nd. The development of the national feature of the age as a military power.*

The main principles of my subject are so important, that I have been led to devote most of my time to them. I will, in conclusion, as briefly as possible, sketch the nature of the higher education for non-commissioned that I would propose.

Military History in a popular form.

In the first place, to lay the only sure foundation on which to build *a feeling of pride in his profession*, I would advocate lectures in military history in a popular form. Every one probably has attended lectures of this nature, the magic lantern or large diagrams being called in to fix attention. I look upon this as the most important branch of instruction for non-commissioned officers.

Minor Tactics.

To foster self reliance and readiness of resource, I would advocate a study of tactics†, based, as much as possible, on the more popular lectures I have alluded to; but carried out with note book and pencil and tested by examination and catechism.

Reconnaisance work has been going on for many years; but it requires uniformity and direction. As long as these matters are left as optional they are only useful as a safety valve for the superfluous energy of the more zealous amonst the subalterns; unless uniformity is introduced, and the acquisition of professional knowledge taken into account in selecting non-commissioned officers for promotion, the result cannot be satisfactory. I do not advocate every non-commissioned officer being taught reconnaisance work; but the number to be trained should be laid down and some one held responsible for that training.

Professional education the first step. General education the second.

I consider this should be the first step; and the next I hold to be the introduction of school classes in general subjects, to fit men for civil employment on leaving the army. This is not suggested from any philanthropic point of view, but solely as an aid to discipline; as the development of mind and thought; and above all, as a bond between officer and non-commissioned officer.

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* As Colonel Home observes, there is nothing that tends to raise the moral power of an army more than education; the consciousness of possessing superior knowledge adds greatly to the power of an army.—*Précis M. T.*

Boguslawski says in his last book—

"The education of a nation in general and its military education in particular are the sources of the tactical efficiency of its army." *Lecture by Col. (now General) Clive at R. U. S. I. 1878.*

† "Now what are the essentials of a good fighting formation? It must have a large front of fire. Its leaders must be *skilled in tactics*, in observing, and making the most of features of the ground, both in order to shelter the men, and also to bring a concentration of fire upon certain of the points of the enemy's position. *Idem.*

While on this subject I should like to point out the immense amount of good that is being done for the army by the National Association for the employment of reserve and discharged soldiers. At the third annual meeting of the association at the Mansion House, the Lord Mayor in opening the proceedings said.—It appears to me that in encouraging the association and bringing before the citizens of London the men they can employ, we shall not only be doing great service in recognising what these men have done and the services they have rendered the country, but we shall also encourage those to enlist who now hesitate taking the Queen's shilling ; *and perhaps even induce a higher class of men to enlist from the knowledge they will have, that when they return to their country, after having served in our Colonies and elsewhere, they will find employment worthy of the occupation they have left.* And perhaps even, they will be able to better their position from the fact that returning home with good characters they will receive posts of trust in which they may hope and expect to find a reward for the hard work they have gone through.

If any one will take the trouble to look over the papers I have here they will see the influence at work at home to find employment for our soldiers—The question we have to ask ourselves is—are we doing our share of the work out here, are we preparing men to take their places in the great struggle for employment when they leave the ranks, are we giving them a school education on parallel lines with the national system now worked at home? Our schools have not moved one step forward in the last 18 years and the lack of interest shown in their work is astounding. It is for us then to prepare the bricks for the National Association to build with ; it is for battalion commanders to ensure the success of an association that will bring the flower of the nation into our ranks. To those who answer that our non-commissioned officers and steady men require no encouragement to leave, that the difficulty is to keep good men when you have got them, I would say—trust to a healthy sparkling stream rather than a dammed up stagnant pool. To prevent your salmon returning to the sea will not secure you a good supply of fish.

Sir Donald Stewart advocates that classes be formed in all batteries and cavalry regiments for instruction in driving with "long rein," and that in all corps soldiers should be systematically instructed as waiters, plate and lamp cleaners &c., that they should be taught knot-tieing, splicing and fastening spars &c.

It is impossible to exaggerate the importance of this subject to the future of the army ; but my time only permits my making a passing reference to it.

Instruction to be regimental.

I will not recapitulate the arguments in favor of regimental instruction, as compared with instruction imparted at schools, or special classes ; the subject is fairly settled in favor of the former.[*] The second in command seems to be from all points of view the proper man to assist the C. O. in carrying out the instruction of the non-commissioned officers together with the subaltern, who under present conditions, carries out the reconnaisance instruction.

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[*] In Prussia they have "Vorschulen" (preparatory schools) to which sons of soldiers or tradesmen are sent at the age of 11 or 12. From these they pass into the non-commissioned officer's schools and out of these they are selected for

But to ensure uniformity and satisfactory results, Garrison Instructors should visit regiments during the winter and examine the non-commissioned officers closely on the subjects taught, reporting upon the efficiency of the teaching.

The use of regimental papers as an indirect means of instruction,

There is an indirect means of educating the soldier, which is not to my mind sufficiently considered—I allude to regimental papers. I have copies of some regimental papers here, which I should like anyone to look at with a view to judging of their utility.

That the men appreciate Military History, when divested of its crust of dry facts and rendered in a readable form, is I think very conclusively shown by the fact, that the number of copies of the April number of "Our Journal," containing descriptions of some of the battles of the Sikh war, sold to non-commissioned officers and men, was 474, as compared with 278 before the introduction of these Military History sketches.*

In my opinion, there is no better channel for promoting in the soldier a pride in his profession and a knowledge of the glorious history of our arms, than through the medium of a regimental paper. This is only one of the uses of such an institution, and by no means the most important; but it is one of sufficient importance to repay the little trouble connected with editorial work.

If commanding officers would only recognise the value of such education, regimental papers would become more universal and of an improving standard. The editorial duties becoming less as the system became more general.

The evils of markers in battalion drill.†

I have confined myself to suggesting improvements that can be introduced in this country, and without expense; but I cannot help adding, before I close this lecture, that until the use of markers at battalion drill is abolished, there will always be an unnecessary retarding influence at work, rendering the development of the non-commissioned officer I have sketched more difficult.‡

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regiments. As a rule regimental and battalion commanders do not care much about them. They prefer the non-commissioned officers who have risen from the ranks. They are more useful and less uppish.

See also paper by J. Ross of Bladensberg, Coldstream Guards. Vol. XXII. R. U. S. I.

Also Armed strength France, Germany etc.

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*Colonel Maurice, referring to the increased demand for "Our Journal" on the introduction of Military History sketches said at the R. U. S. I. "This is a phenomenon interesting in itself and I think it is closely connected with the question of the training of our troops for war,"

(Discussion on Lecture on Drill by Col. Maurice, Professor Mil. Hist. Staff College, 1888.)

† Prince Hohenlohe says—

" You have entirely misunderstood me if you have gathered from the wish

The fighting power of an army cannot be guaged by outward appearances.*

"The exterior of a trunk of a tree may be perfect and sound, but in spite of this deceptive covering, the interior may rot away and die, and the first storm may blow the tree down if the interior is unsound. It is inwardly that we want the soldier beautiful; it is inwardly we must make him smart and soldierlike. It is the true beat of a stout heart in a manly breast that we must look for, and not the mechanical beat of the drill footstep on the parade ground.†"

At the conclusion of Captain Kitchener's lecture General Elles said that if any of those present had any remarks to make he would be glad to hear them.

Captain G. M. Bullock said he was sure they had all listened with much interest to the lecture, but he had a certain feeling of regret at the summary way in which the lecture had passed over the question of central schools for the instruction of non-commissioned officers. Instead of referring to Germany he might have dwelt on the results of our own experience during the long period when we had central schools for the instruction of non-commissioned officers both in this country and

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which I expressed for some alteration in our drill regulations that I desire to *reduce in the least degree our steadiness and precision*. On the contrary whilst wishing to see such details as practice in turning, in rifle exercises, and such-like, discontinued as a part of battalion drill, I meant to insist all the more upon such elementary branches of instruction being taught most thoroughly and exactly at company drill. And at the same time I recommended that *these details should be limited to what is absolutely necessary* so that each point should receive all the more attention and that drill should be conducted under the closest supervision; in short my desire is that elementary tactical instruction should be completed in the company instead of being carried on, as now, in the battalion.

(Letter on Infantry translated in R. U. S. Journal xxix.)

‡A battalion, if it have to deploy must learn to do so rapidly and silently without points, and properly instructed, the companies in succession will come into alignment and lie down, the flank men putting up their forearms or rifles for the next company to dress by; and when they find this is expected the men will rise to their higher duties, and the formations will be just as good.

Lecture by Colonel (now General) Clive R.U.S.I.

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* Vide 1866 and 1870-71.

† Archduke John.

Capt. Grierson R. A. has kindly furnished me with the following information. There are special schools in every German regiment, in which the volunteers (3 or 4 year not 1 year men) are trained by selected officers to be N. C. Os. and in them all branches are taught, including map-reading; but the Germans dont go in for sketching to the extent we do. They think it sufficient if a *croquis* or rough eye-sketch is made. More than that and map reading is never taught the N. C. O. Reconnaissance of the enemy is the principal thing; our so-called reconnaissances are mere topographical ones, and I have never yet seen a reconnaissance sketch of an enemy's position taught to a N. C. O.—Great weight is attached to history, especially military history, and also to clear and concise writing of reports.

The N. C. O. schools you mention are mere preparatory schools for boys of 14 to 16 who remain 2 or 3 years in them and then enter the army as "under officers" *i. e*, real, not rank and file, N. C. Os. They receive a general military and ordinary education—they have to serve 2 years in the army for each year passed at the school. Of course they are all professional soldiers who re-engage. Every corps has to keep so many vacancies for these pupils.

at home. Of course there were many opinions about the best system of musketry; instruction, but few officers would deny the immense good derived from the instruction at Hythe in securing uniformity and interest in musketry, and by having more schools of the same kind we might secure much larger results than we had now. Such schools for general improvement in drill and tactical knowledge used to exist in India previous to the Mutiny, and Lord Frederick FitzClarence established a school at Poona which had greatly influenced the shooting of the Bombay Army. He (Captain Bullock) thought it would be a good thing to establish central schools for the instruction of non-commissioned officers in drill, reconnaissance, and the other subjects so ably put forward by the lecturer. There was another point, and that was whether we could not secure a better class of non-commissioned officers by offering enlistment to men who passed a certain examination. After a year in the ranks these men, if favourably reported on, would be promoted to the rank of corporal, and in another year to that of sergeant, and then they would take their chance with the rest of the non-commissioned officers. Of course it would be necessary to limit the number of these men.

Major A. D. Anderson said he thought they must all agree with the lecturer and Captain Bullock in their desire for the higher education of non-commissioned officers, but it would be a mistake to aim at too high a standard until they were quite sure that the men had mastered the lower education which was part of their duty. Nor could he quite agree with the last speaker in saying that we required schools for instruction. The young officers in our army were better educated than in any other army in the world, and they should be able to teach their men rather than resort to schools, where a large amount of power was necessarily lost. The first object should be to make the non-commissioned officers recognise that they were teachers under their officers, and no officer could do better by his men than by seeing that the non-commissioned officers knew their ordinary drill and could teach it. After doing this they might go on to reconnoitering, military history, and so on.

Major G. B. Morris said that with reference to teaching military history he had tried it himself, and unless you got some other subject to interest the men they wolud not listen. The men came as a matter of compliment; and it was extremely difficult to make things plain to them. Then it was a question whether officers had time to teach their men, however ambitious they might be. He had had the honour at Rawalpindi of teaching a class of the most intelligent men he had ever seen, who had been selected from different regiments, and he had found it extremely difficult to make himself understood by them. It was very difficult to teach them to put their ideas on paper.

Captain Grierson, R. A., referred to the importance of teaching military history, which he thought could be easily done if the subjects selected were taken from the history of the regiments, so as to interest the men.

Captain Kitchener, in replying to some of the points raised, said the Military Attaché at Berlin had informed him that the non-commissioned officers' schools in Germany had not answered well. The schools were not on the lines of Hythe, but they were schools from which the men could enter the Army as non-commissioned officers, and it was found that they made the men "uppish." Schools on the Hythe pattern were not only expensive, but left a great deal of power wasted, and threw work on the men who had not the luck to be selected. The time for teaching, he thought, could easily be found. History could be taught in the evenings, and theoretical subjects from about 10 in the morning to an indefinite hour afterwards. He thought it was very necessary to fit a man for civil as well as military life, especially under the short service system; otherwise the Association for employing discharged soldiers in England could not find work for them. During the last three years, out of about 6,000 men employment had only been found for 1,200.

General Elles, in conclusion, said he thought there had been some misapprehension on the part of the lecture with regard to regimental schools. They had done a vast amount of good, and had gone on improving till at last in England they had been improved away altogether. Great strides had, however, been made in national education, and the effects of this must be apparent in time. The more educated the nation was the more efficient would the army become. A proposal had recently been made that non-commissioned officers, instead of being examined in history, geography, and so on, should attend the examination held for officers in the Garrison schools. He quite agreed with Major Anderson as to the importance of being sure of the lower education before attempting the higher, and that lower education must be regimental. Men must first be perfected in the mechanical work of drill, and the first steps towards making a man a good skirmisher was to see that he was good in close order. They would all agree with Captain Grierson as to the value of teaching history, but there would be a difference of opinion as to who should do it. He thought it should be given to some one who had an aptitude for teaching. He thought they ought to encourage regimental officers to take an interest in their men and impart their own information to them, and in this way they would receive the most valuable instruction. He had to thank Captain Kitchener on behalf of those present for his interesting lecture.

THE FOLLOWING COURSE OF VETERINARY LECTURES

WERE DELIVERED AT THE UNITED SERVICE INSTITUTION DURING THE MONTHS OF AUGUST AND SEPTEMBER,

BY

G. A. Oliphant, Esq., F. R. C. V. S., P. V. S. in India,

J. H. B. Hallen, Esq., M. R. C. V. S., F. R. C. S. E., F. R. S. E.,
General Superintendent Horse Breeding Department,

G. J. R. Rayment, Esq., F. R. C. V. S., Assistant Superintendent
Horse Breeding Department.

1.—Introductory.
2.—Locomotory apparatus, composition of bone, varieties of bone. Skeleton bones.
3.—Bone diseases, fractures.
4.—Ligaments, joints, tendons, muscles.
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6.—Sprains, dislocations, ruptures, cramp.
7.—Digestive system. Digestion, nursing.
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Mr. Hallen's Introductory Lecture and Mr. Rayment's "Method of examining horses as to soundness," are herewith subjoined.

INTRODUCTORY LECTURE,

DELIVERED BY MR. HALLEN.

Many years ago I served with the 1st Bombay Cavalry as a regimental officer, and the remembrance of the pleasant days I then passed in the jungles, shooting, pig-sticking and coursing with my brother officers, who were all sportsmen, will never be effaced from my memory. True lovers of the horse, they were all keenly anxious to learn as much as possible regarding the noble animal in health and disease. Partially to gratify them, and also because I was of opinion that good horsemen like these should acquire as much knowledge of equine ailments, conformation and management as possible, I arranged for the formation of an officers' regimental class. Parades, garrison duties, etc., kept us busily engaged through the week, so we were compelled to fix Sunday morning as the only day on which we could spare the time to assemble at the sick lines. It was wonderful in how short a time they learned to detect the seat of lameness, diagnoze ordinary cases etc. I know that people in reference to such classes quote the well worn proverb "a little knowledge is a dangerous thing," but in the case of educated men practical experience leads me to the opposite conclusion.

Throughout my long career in the service I have met with no more staunch supporters than the officers of my old regiment. My colleague in this course of lectures, Mr. Rayment, informs me that when serving with the 1st Madras Light Cavalry, now Madras Lancers, he instituted a class for the instruction of his farrier, with excellent results, particularly when the regiment went on service and had to be broken up into detachments in charge of these men.

With the Carabiners in Sialkote, by the request of the commanding officer he gave a short course of lectures to the officers and non-commissioned officers with gratifying success.

I quote these cases, gentlemen, to prove to you, that we are not jealous of our knowledge, and that we wish to disseminate as widely as we can a practical acquaintance with veterinary science, particularly with those natural laws which govern veterinary sanitation and hygiene. It is our earnest desire to work with officers who will understand the why and wherefore of the recommendations which we give for the suppression of disease, and the maintenance of health amongst army animals. It is a true pleasure to us to see our instructions thoroughly comprehended and carried out with a spirit of intelligence, and not treated as some deep hocus pocus sort of mystery which may or may not have any useful end.

Veterinary surgery has, I am thankful to say, long passed the era of farrier's nostrums, rule of thumb treatment and groping in the dark for remedial measures for diseases little understood. We have emancipated ourselves from these, and they are as much things of the past as the barber surgeons and their primitive methods are in connection with medical science of the present day.

The veterinary art is now practised on a sound scientific basis, and the best practitioner is he who combines a sound knowledge of anatomy, physiology, and kindred branches of science, with a thoroughly practical acquaintance with the domesticated animals. Impressed with these ideas I, in 1859, started in Poona a Veterinary class. It was well attended and many officers from the British Cavalry Regiment then stationed in Kirkee attended. From these small beginnings arose the present Bombay Army Veterinary School at Poona, the only one, I regret to say, in India. Madras sends her officers, non-commissioned officers and men there, and finds it sufficient for her wants. But Bengal is backward. No Army School exists and the officers of the mounted branches of the Bengal army have no opportunity of learning, what I think you will all agree with me, is a very important part of their work.

Of the good done by the Poona School, we have proofs every day. And in no Presidency of India are the services of Veterinary officers more thoroughly appreciated and their work made more pleasant for them than in Bombay.

It is the sincere desire of myself and my colleagues Messrs. Oliphant and Rayment to make this short course of lectures the nucleus of a future Army Veterinary class, to be held in Simla during the summer months.

Cavalry, Artillery and Transport officers should most certainly possess the rudiments of veterinary knowledge sufficient at all events to enable them to manage the animals placed under their charge according to the principles laid down by modern veterinary sanitation and hygiene, the want of which within my own personal experience has frequently caused heavy loss to the State.

Believe me, gentlemen, that first as mounted officers, and secondly as sporting men, whether pig-stickers or lovers of the turf, you cannot know too much of the noble animal which carries you under fire, in action, brings you up first to a fighting boar, or lands you a winner after a hotly contested race on the flat or across country.

METHOD OF EXAMINING HORSES AS TO SOUNDNESS.

Delivered by Mr. Rayment.

1. Lead the horse gently out, and if possible he should have been standing in the stall some hours, and let him stand for a short time, observe whether he points with either fore foot or rests any particular leg and the attitude he assumes when standing.

2. Trot him steadily away from and to you. While trotting away look for lameness or stiffness behind, especially when first starting, observe whether he flexes his hocks well and equally, whether he goes close or straddles, whether he rolls in his gait. When turning watch the hock action, and the motion of the loins. On coming towards you look for lameness or stiffness in front; for close action, brushing, speedy cutting, toes in or out, dishing, carriage of head, star gazing or otherwise, or neck awry; should the examiner think that the horse goes lame at first, but afterwards fail to detect unsound action, he should

tie the animal up for half an hour or so to cool and then trot him again as lameness is frequently evanescent and passes off with exercise, and by allowing him to stand he stiffens on any unsound limb.

3. Halt the horse and walk quietly round looking over him, any glaring unsoundness will thus be detected and save the trouble of further examination.

4. Advance quietly to the side, and facing towards the horse's head, examine with the right hand the withers and back for fistula or saddle gall, thence bring the hand down, along the shoulder blade, observing if there be any wasting of the muscles in this region ; feel the shoulder joint for enlargement, heat, or tenderness. The hand now passes to the knee feeling for scars, capped knee, heat or enlargement indicating inflammation of joint, then along the front of the cannon bone for sore shins the fingers feeling along the course of the inner splint bone for splints or knee spavin, on to the front of the fetlock for heat, swelling etc., over the pastern for ring bone or inflammation of coronary band, to the hoof looking for sandcrack, to the toe for ridginess, or bulging, and feeling both feet to detect any difference in temperature.

5. Turn round and with the left hand feel the point of the elbow for capped elbow, and looking at the horse's side for girth gall, pass the hand down the flexor muscles to the back of the knee, below the knee for speedy cut, spavin, or enlargement of check ligament, flexor tendons or their sheaths, and skin disease, and then to the fetlock ; while doing this look down the inside of the off fore for speedy cut, brushing, and sandcrack in the inner quarter of the hoof ; at the fetlock feel for wind galls, sesamoiditis, sprain, or inflammation of joint, and skin disease (rat tail); if thought warm, feel the opposite fetlock for comparison : examine the other fetlock ; lift the foot and observe the heel for cracked heels, grease, horse pox ; lateral cartilege for side bone ; sole for undue concavity, convexity or flatness, and notice if the bars are cut away, or the sole pared, and if the frog be in good condition and there be no offensive odour of thrush ; observe the description of shoe if thick or thin, if the heels are thick, if it is a bar shoe, tip, high heeled or ordinary, if any nail or nails are left out, if worn or turned up at the toe, if shod to prevent brushing, if heels of shoe and foot are wide or wired in and contracted, if the animal has false quarter.

6. Give the foot to the attendant to hold and pass to the near hind, facing towards the head, notice the loins and flank to see if there be any wasting of muscles, pass the right hand over the stifle joint and along the front of the tibia to the hock, examine for bone spavin and bog spavin ; compare both hocks with the right hand, and notice any heat or tenderness ; look if the animal be a stallion, rig or gelding and examine the scrotum, prepuce, or mammœ (if mare) for warts, melanosis, hernia, dropsy, mammitis &c., then look along the inside of the off high for farcy buds, scars along the lymphatics or enlargements from lymphangitis. In the hollow of hocks feel for skin disease (sallenders); below the hock as in the fore limb, being careful not to confound enlargements from heel ropes with ringbone.

7. Turn round and with the left hand feel the tendon achilles and the point of the hock, for capped hock, and in front of the point of

the hock for thorough pin, back and below the hock for curb, below which as in fore leg. Stand back and look from the point of hock downwards for curb, pass behind and compare the hips, quarters, and buttocks, and feel the tail for melanosis, note the carriage of the tail to see if there be any injury; observe the anus and its shape, in a mare the vagina for melanosis etc.

8. Order the attendant to drop the near fore leg. Go to the off fore and proceed as with the near fore and hind.

9. Stand in front of the horse; compare the eyes, as to whether one is smaller than the other, the sides of the chest, shoulders, knees, fetlocks, and hoofs; stand on each side and look diagonally at the hocks to detect spavin.

10. Put up the jugular vein on the near side, look for farcy buds on the neck and the sides of the face, and for scabies, feel the submaxillary lymphatic gland for enlargement, examine the membranes of the nostrils for glander ulcer, healthiness or otherwise of color, and polypi, also for nasal discharge or offensive odour. Examine the mouth, the teeth for age, irregular growth, parrot mouth, the tongue for torn tongue, the sides of the mouth for bit bruise, or offensive odour, the molar teeth for irregularities, poll for poll evil, eye for triangular lid indicative of opthalmia, torn eye lid, warts, weeping &c. Then placing the animal in a proper light, with a black shade (or hat) look diagonally and straight into the eye, noting opacity or white specks in the cornea, into pupillary opening for torn corpora nigra, lenticular or capsular cataract, glaucoma, parasite, or scar from operations for parasite, and amaurosis; note the color of the membrane of the eye-lid. Proceed to the off side and repeat the inspection. Be careful to examine both sides of the mouth for age.

11. Put a man up, and observe if the horse gives in the loins when being mounted, and if he crouches when starting; if so back and turn him to test for weak loins. Then gallop till fairly blown, if plough or an ascent be available all the better; halt him suddenly and put your ear close to his nostrils, and listen to respiration for roaring, whistling or broken wind, &c., and observe if hurried respirations subside quickly to normal or not.

CAVALRY CONVENTIONALITIES.

BY COLONEL D. M. STRONG, *10th Bengal Lancers.*

In spite of Von Schmidt's uncompromising dogmatism and the assumption of finality for all his theories, cavalry tactics still supply material for speculators in military science; yet, although many distinguished experts unravel for the professional reader the experience of the past and formulate it into doctrine and matter of an extremely useful and interesting nature, one notable feature in these literary efforts is a certain failure on the part of some of their authors, when imparting their own ideas or commenting on those of others, to rise superior to tradition or to look beyond the conventional haze which attaches itself to the subject.

While there is so much revolutionary activity at work in all departments, the latest cavalry drill regulations being unlikely to escape the general conflagration of reform, the present appears a suitable season for even those who cannot assume to be in the van of constructive criticism, to direct attention to such arbitrary conventions as seem to obscure a clear comprehension of the requirements of the service in which they are professionaly interested. The first and most pressing misconception to be removed, in my judgment, is that connected with the charge of Cavalry *versus* Cavalry. I must here beg for the following remarks the usual indulgence accorded to '*ballons d'essai.*'

THE "CHARGE PROPER."

For the purposes of this paper, by the above term may be understood the advance at full speed of two opposing forces of cavalry in compact order to meet shock for shock. Notwithstanding the fact that so many treatises lead up to this climax, that the enthusiasm of every cavalry soldier circles about it unceasingly, and the *laudatores temporis acti* use this form of attack as the central figure of their speculations, making it the great ideal of cavalry action in the field to which all other tactical considerations are subservient, the experiences and historical data we have to rely upon since the general introduction of rifled arms apparently go to prove that the "charge proper" on a large scale and carrying with it decisive results, is the exceptional *rôle* of this branch of the service. And it must be admitted, I think, that the very meagre records we possess of the instances of the "charge proper" under the above conditions, hardly justify the exaggerated importance attached to it in these days as a determining factor in the issue of campaigns. We constantly read of cavalry charging, but not so often of its being charged by its own kind in the act, and where this opposition is absent the charge becomes simply an attack, a pursuit, or a cutting up of broken units, which have their own special value.

For this unique occasion, a "charge proper," we require placed at the disposal of two forces which are assumed to be of considerable strength, many acres of smooth and level land, with an absence of scattered stumps, small ditches, or slight inequalities of ground, any of which suffice to break the final impetus and cohesion of a cavalry attack; and upon the preservation of the latter conditions depends the whole *raison d'être* of these tactics.

It is often too late to await the signals of "ground scouts" when commanders have committed themselves to an attack or a sudden change of direction, and I believe when it so happens that unforeseen obstacles suddenly reveal themselves in such a situation, insignificant as they may appear at first sight, that force which first seizes the opportunity of utilizing them, instead of attempting to surmount them at the sacrifice of pace and order, and dismounts a proportion of its strength in rear of an intervening obstacle to meet the onslaught with fire from its carbines, will most effectually oppose and cripple the forward movement of an adversary undeterred by the danger of advancing to an attack over broken ground. I must confess that in suggesting the execution of such an unorthodox manœuvre on the very threshold of a collision I am flying in the face of some accepted notions, and especially of the dogma that (Cavalry Drill Regulation, section 9 para 1) cavalry can only be used on the offensive; but the heresy may be condoned perhaps if it is brought into the category of defensive-offensive movements permissible to cavalry.

Even when all conditions are favourable, when we have found the plain suitable for the uninterrupted progress of a first line, say of twelve squadrons, and our enemy chooses to enter the arena in the same formation in preference to drawing us into broken country where they can shoot us down in detail, it is still an open question whether, as preconceived rather than conclusively tested, the force moving with the greater momentum possesses any physical advantage after all. If instances in which there might appear to be some foundation for this assumption could be now analysed and divested of the romance of narrative, it would possibly be found that success was due on these occasions more to the *morale* of the pace than to the actual physical shock, and still more probably to the superior tactics of the victors in outflanking their opponents by means of rapid and skilful evolutions executed at the last opportunity.

According to current ideas the final result of a cavalry encounter will in future be decided by the action of the first line into which every available squadron will be pressed, leaving all other possibilities of success out of calculation; but when we read of the actual condition of these first lines after contact and find that they represent uncontrollable and surging groups, swaying backwards and forwards in indescribable confusion, neither conquering nor conquered, and that at the close of this fierce affray in which numerous and valuable lives are lavishly expended, the general scheme of the campaign has not been advanced a single stage (the success, if any, being "momentary" not "complete") and that the opportune action of a few fresh or rallied squadrons on the scene of this aimless conflict really decides the day, it seems reasonable to question whether we are not sacrificing for a splendid conception, those more sober tactics, richer in results though possibly less attractive in form, the more frequent practice of which, rightly or wrongly, I am disposed to advocate.

For, if it is satisfactorily demonstrated that the result of the first shock does not decide the engagement, but rather the evolutions immediately following the first shock, then to expend so much strength in the first line must be held to be a fatal blunder, the success of an action being assured by means of indirect manœuvres instead of by direct attack.

It would seem then that the duty of a commander will be, not to put the greater part of his fighting material into the first line, but to initiate an attack by striking a number of sharp blows with detached or successive squadrons thrown from every available quarter of the field upon all accessible points of the enemy's lines and columns, while keeping a suitable proportion of his troops in support and reserve for subsequent use. The opposing forces thus harassed in front and flank by these "swarm" squadrons will inevitably fall into disorder and be unable to cope with the compact advance of the supports and reserve. Since writing the above I have read Colonel Hogge's pamphlet on "Cavalry swarms" containing an amplification and more methodical treatment of this idea.

Where the use of the "charge proper" is indicated, such are, I venture to think, the evolutions to be executed when advancing to the attack which will produce the highest possible effect at the moment of contact. Therefore, if I am not mistaken in concluding that the application of this form of attack, *viz*, the "charge proper" on a large scale carrying with it decisive results has been, and will be, the exceptional *rôle* of cavalry, it follows that the time has arrived when our tacticians should be preparing to work up to a wider and more practical consummation, and to utilise with greater persistence, at camps of manœuvre, more constant and valuable factors in an engagement than that of the "charge proper," so that these precious opportunities may not be lost for the perfection of our Indian light cavalry in all those strategic and tactical arts which the circumstances of modern warfare bring most frequently into play.

To give a local colouring to the subject we may conceive that on the first necessity of mobilization on our scientific frontier arising, and in the event of a cavalry division with its proper complement of horse artillery being assigned its legitimate position of precedence and getting clean away to the banks of the Helmund, while the infantry divisions are forming in rear, it is unlikely to find itself engaged there or beyond in out-manœuvring a force of similar strength and composition, but rather in falling upon scattered groups of enterprising Cossacks and marauding Afghans, in rival schemes of reconnaissance and in struggles for forage: and if commanders, as is their wont, unmindful of the maxim that it is wiser to bring fresh material *late* into action than stumbling chargers *early*, exhaust their cavalry through unbridled zeal in the performance of these important and prefatory duties, there will not be much "heart" left in the horses, should the occasion ever present itself, for the realization of that soldier's dream of glory—a successful and overwhelming charge.

If then we must perforce assign to the practice of manœuvring large bodies of cavalry in opposition to each other a secondary position in these considerations, we may feel quite confident that too much attention cannot be given to less brilliant tactics offensive and defensive-offensive, such as the sudden surprise of the enemy's columns, the capture of batteries, raids on convoys and their repulse by counter-manœuvres, as well as to the practice of drawing hostile cavalry into intricate positions or unfavourable ground and then dismounting to receive them.

With this end in view therefore and to meet the most urgent needs of the day while funds and opportunities are scarce, it would seem expedient to associate all arms at future camps of manœuvre.

OUTPOST DUTY.

It has been my lot and assuredly that of many others in the profession of arms to suffer much from the perplexities and inconsistencies which float about the practice of outpost duties.

There is no position where the intentions and conceptions of a commander are more constantly misconstrued and discredited than that of an officer charged with the disposition of outposts in peace operations. And the cause, in some cases, seems to be none other than this, that the inspecting officer is wont to impress upon the imaginary circumstances the stamp of an unalterable conviction as to the course, we will say, a bold and alert opponent will pursue in evading or attacking the several posts of observation and defence, while the immediate commander is indulging in speculations of an entirely different hue, possibly providing for an unwary enemy being easily led by a weak display of vedettes into a carefully planned ambuscade. *Hinc illæ lachrymæ.* In order to set at rest for ever the possibility of these fruitless contentions and conflictions of ideas arising in the future and to crush out the argumentative element with which the whole subject is permeated, I would suggest that all arbitrary regulations beyond a bare outline to illustrate the general principle of outpost requirements should be eliminated from our schemes and pamphlets of instruction be issued and a greater dependence upon the circumstances, temporarily existing or conceived, be calculated, and more credit allowed to the intelligence of commanders than it is the present custom to concede.

A difference of opinion on a very small detail of these peculiar duties often suffices, under the existing system, to agitate the military mind unnecessarily and distract the unfortunate rank and file tossed to and fro upon a sea of perplexity by attempts to impose upon them a definite mode of action on all occasions in presence of the infinite accidents of outpost work. For instance, some may assert it to be absolutely indispensable to avoid observation, and to have the weapon available for signalling to the rear, that the vedette's lance should be brought to the "trail," while others contend that the lance must invariably be slung and consequently conspicuous in order to allow the carbine to be used in cases of surprise.

HEAVY MARCHING ORDER.

A vast amount of trouble and ingenuity is periodically expended in devising a heavy marching kit for cavalry, and the troop horse under the present suggested pile of encumbrances may be said to resemble that of the knight in a popular romance who to meet all contingencies loads his charger with mouse traps. "If you want to disable your cavalry at the outset of a campaign, array it in heavy marching order" might prove a useful maxim to popularise. I contend that cavalry should never be handicapped in this absurd fashion as long as the usual resources of civilized warfare are available; the extra mobility requisite and the economy of horseflesh resultant point to the unquestionable necessity of cavalry being unencumbered of all avoidable weight and of being invariably accompanied by "flying" transport such as lightly laden and fleet mules or ponies. A cavalry division thus equipped with transport would work further afield and retain its power of efficient action longer; and every mule supplied for this purpose would in the end at the lowest estimate be worth to the General and to Government two or three troop horses.

EQUIPMENT.

Convention imposes on the Lancer the carrying of a sword. Suspended from the saddle its position is necessarily low and it interferes with the action of the small horse ridden by the native trooper. A revolver worn on the belt should be substituted as a supplementary weapon of self defence for the rank and file of all Lancer regiments.

"BREAKING UP."

The practice of "breaking up" immediately after the attack is contrary to the principle of "knee to knee" charges which if made by well trained cavalry pre-suppose no *mêlée*; and to represent disorder as the normal condition of the squadron after the shock, tends to unsteady the ranks. Broken squadrons should be practised in rallying independently of the charge.

AN ANSWER TO

"A PLEA FOR THE ADOPTION OF THE COMPANY AS THE BEST UNIT OF COMMAND IN INSTRUCTION AND TRAINING AND SUPERVISION IN QUARTERS" BY LT.-COL. W. E. GOWAN, 38TH B. I., JOURNAL OF U. S. I. MARCH 1888.

By Captain J. G. Ramsay 24th Punjab Infantry.

I feel sure that everybody agrees with the writer of the paper I propose to try and answer, that the insufficiency of British Officers is a prominent blot in the present organisation of Native Infantry.

Infantry, the arm that has to win our battles, or ward off disaster—is at present found with fewer British Officers than the cavalry, who could, one would think, more easily do with less. Their losses in action are usually less, their class of native officer as a rule more intelligent, and their action being "shock action" they fight together and not extended as do the infantry. Yet they have two officers per squadron, or one British Officer to about 60 sabres, while in the Infantry there is only one British Officer to 102 bayonets; thus the infantry officer has nearly double the number of men to look after and those too in extended order. What is more the British Officers in the cavalry are usually up to strength whereas in the infantry it is the exception, not the rule, to get a wing officer who wishes to remain with the regiment. They most of them hope for cavalry or some other appointment.

Now as to Col. Gowan's "recognised short comings of representatives of the native commissioned, and non-commissioned ranks" I think these are in a great measure due to our own fault. The British Officer, in the higher grades especially, has tried, and tries, to do too much. The Native Officer, possibly in many cases of an indolent disposition, lets things slide, thinking naturally enough, that if it please such and such an officer to try and do all the work himself, let him.

The wing commander has no right to bear "the sole burden of the training of his 450 men." He has one or perhaps two wing officers under him, to whom it is only fair to give a chance of learning their work; they may be as good or better than he is himself at this kind of work, but he gives them no chance—running still in the very old fashioned groove of thinking that there is no one capable of doing musketry, company training, or anything else, in his own wing, except himself.

Under such circumstances can it be wondered at that when a subaltern is appointed adjutant from being a wing officer, and practically a non-entity, he should feel a little above himself, and be apt to get himself disliked?—which would appear to be rather Colonel Gowan's experience.

We find in many cases, alas, that the interest in the Regiment is vested in the Commandant and Adjutant, and perhaps the two Wing Commanders, no one else in the Regiment knowing anything about what is going on.

The result is what Colonel Gowan calls the "marker"* class of subaltern, or at least what I presume he means by the "marker" class.

Now, had that "marker" subaltern from the commencement of his career with a Native Infantry Regiment, been given his fair share of work, and allowed to take his share of interest in his wing, or, if the wing commander liked, his two companies of the wing, he would never have reached this phase.

But with the old fashioned ruinous idea of backing one wing against another, and with that idea, endeavouring to do all the work of the wing himself, thinking no one else capable of keeping up the average, etc., the wing commander manages to keep the subaltern's military faculties latent—in many cases so latent indeed that they often die out entirely.

The same applies to the native officers. Many of them, indolent by nature, finding that it pleases the wing commander to try and do everything himself, turn their attention solely to taking life as easily as possible, and to saving as much money as they can; the result being what Col. Gowan describes,—the girths of their stomachs increase, and their standard of mental excellence proportionately decreases.

It seems to me therefore that either we must have no native officers, and British officers to command companies, or else we must allow the native officers to command their companies, and take care that they do so.

If we do away with native officers, I think we shall lose touch with our men considerably: a British officer can never hope to fathom the many little ins and outs of a company of native soldiers, however fond he may be of his men; and the native officer seems the proper link between the two.

If we had, as Col. Gowan proposes, two native officers and one British officer in a company, I feel sure that either the native officers would lose their identity, or, if the British officer happened to be of an indolent turn of mind, he would do nothing, and would have a better opportunity of joining the "marker" class.

I believe the native officer is capable of a great deal more development than we give him credit for; and indeed the company training introduced of late years has shown us that this is so. In these days, when direct commissions in the native infantry are more and more frequent, we are getting intelligent youths of good fighting families who are of an age and capability to really learn their work in all its branches if we only carefully instruct them. In olden days no doubt the position of a native officer was looked forward to by the older non-commissioned officers as a haven of rest, and when they reached it they sat down only to get up when obliged, many of them only wishing to put in three years or so in the commissioned ranks, so as to get the higher pension.

But now a days they have to know and do more, and every day the amount they have to know increases.

Putting aside the subject of expense, which I will come to later on, I see grave objections to Col. Gowan's self-contained company system. His eight companies would be worked like eight little battalions, each with their own drill instructor, etc. I should pity, under these circumstances, the commandant and his staff officer. Captain A's plan of working his company would probably be quite different to Lieut. B's and so on. Each company would have some difference in it, and the whole machine would be out of gear.

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* 'Marker' is an erratum in No. 70 U. S. I. Journal of March 1888 for 'Masher.'

Again, one company would probably be worked harder than another, and dissatisfaction would arise in the companies themselves. I would therefore say—leave all the native ranks as they are.

With regard to recruiting, I quite agree with Col. Gowan that the present system is open to many objections, and I should like to see depôts attached to each three linked battalions, and moreover to see the three battalions territorialized. This might be arranged without any extra expense to Government by one battalion—the last for service—being at the depôt, and doing the recruiting for the other two. I don't know how the service roster is kept in these days, but with three battalions they might change about every three or four years. The senior battalion and second senior battalion being on the service roster for 3 or 4 years, the junior being at the depôt, and feeding the other two with trained recruits; at the end of that period one of the other battalions would take the place and duties of the junior battalion at the depôt and the latter would come on to the service roster.

In time of war the battalion at the depôt would feed the other two service battalions with its trained soldiers; in its turn filling up with the active and garrison reserves, and with recruits whom it would enlist and keep on training.

The annual training of all the reserve men of the three battalions might too, with advantage, be carried on at the depôt.

In Col. Gowan's system I don't see what the two ½ battalion commanders are to do to employ their time, while with double company commands, and two British officers to each—as I propose to show below—a most excellent system of training and instruction might be carried out; no one could complain of having too much to do, and yet, if they took an interest in their commands, there would be plenty of work for all.

With eleven British officers and sixteen native officers I think an infantry regiment would be well commanded, even on service. Against the present arms of precision, in any of our future battles, there is sure to be a great loss of officers—we see how great from the Franco-Prussian and Russo-Turkish wars.

The British officers with a Native Regiment, being more conspicuous, and so more easily picked off, will suffer the most; but I believe in action the properly trained and intelligent native officer would be able to hold his own, even when one or both of his double company officers were down; they have shown us over and over again that they don't fail for lack of pluck

The double-company commander must be mounted to be able to command and supervise with any effect his two companies. The Germans now keep their company commanders mounted throughout the action, even at the risk of their being sacrificed, in order that they may always be seen by their men.

I believe myself, a 14 hand or even 13-2 pony would be the best thing for the infantry officer, so that he can easily mount or dismount as the exigency of the occasion may demand.

The small man with the big horse is rather at a disadvantage if he has to get up quickly in action, though, when mounted, he may look extremely nice in peace-time.

Now, as to the expense of Colonel Gowan's system of having British officers with a Native Regiment, as compared with the expense of our present system.

Taking Colonel Gowan's system at it's cheapest in regard to the ranks of his officers we have

British Mounted Officers.

	Rs.
I.—Lieut.-Colonel, Commandant.........	1,427.
II.—Major, 2nd in Command..............	789.
III.—Major, ½ Battn. Commandant.......	789.
IV.—Captain, Staff Officer..................	575.

British Officers on foot.

V.—Captain in charge of	A.	Coy.........	575.
VI.—Lieut.	ditto	B. Coy.........	425.
VII.—Lieut.	ditto	C. Coy.........	425.
VIII.—Captain	ditto	D. Coy.........	575.
IX.—Captain	ditto	E. Coy.........	575.
X.—Lieut.	ditto	F. Coy.........	425.
XI.—Lieut.	ditto	G. Coy.........	425.
XII.—Captain	ditto	H. Coy.........	575.
		Total Rs. ...	7,580. per mensem

Under the present system we have.

I.—Lieut.-Colonel Commandant..........	1424.
II.—Major 2nd in Command...............	910.
III.—Major, Wing Commandant...........	870.
IV.—Captain Wing Officer.................	474.
V.—Lieut. Adjutant........................	425.
VI.—Lieut. Quarter-Master.................	375.
VII.—Lieut. Wing Officer..................	325.
VIII.—Lieut. Wing Officer..................	325.
Total Rs. ...	5128. per mensem.

Colonel Gowan's system certainly gives us four more British officers, but at a cost of Rs. 2,452 per mensem more than at present. His Staff Officer has to do the work of the present Adjutant and Quarter-master's offices on the same pay as one of his Captains gets for merely commanding a company, added to which he has the extra expense of keeping up a charger.

The double company command system seems to me to be likely to prove more efficient than either of the above. Though more expensive than our present system it is cheaper than Col. Gowan's.

It is as follows.

British Mounted Officers.

		Rs.	
I.—Lt. Col. Commandant		1,424	
II.—Major	in charge of double companies	840	+ 60 when 2nd in commd.
III.—Major		840	
IV.—Captain		574	
V.—Captain		574	
VI.—Adjutant		425	
VII.—Quarter Master & Transport officer		400	

British Officers on foot (for drill parades only.)

VIII.—Lieut.	double company officers.	325
IX.—Lieut.		325
X.—Lieut.		325
XI.—Lieut.		325

Total Rs. 6377 + 60 = 6437.

By this system we should have one officer less than Col. Gowan's system would give us, but we save Rs. 1,143 per mensem, and have no officer with unassigned duties as his two half battalion commanders would be.

The system I propose would involve an expenditure give of Rs. 1,309 per mensem more than our present system does, but would us three give more fighting officers per battalion, and every officer would have his own peculiar duties assigned to him, and would I think, as I said before, find them neither too much nor too little.

LETTERS ON STRATEGY.

BY

Prinz Kraft zu Hohenlohe Ingelfingen,

TRANSLATED BY LIEUT. CAMPBELL, 25TH P. I.

LETTER I.—INTRODUCTION.

WHAT IS STRATEGY?

(Extracts only are given from the Introduction.)

* * * * * *

Strategy is not a science. It is an art. A man must be born to it. This art has a large number of sciences and arts in its service, and the strategist must at least have an idea of all of these, so that he may turn them to proper account, although he need not be grounded in all. One may write upon strategy in just the same way as upon the arts of fencing, of riding &c. Never, however, can any one teach strategy scientifically in such a way that another can carry it out according to his teaching. Never can any one become a strategist by study alone, just as little as he can learn from books alone to fence and ride. The chief qualification for a strategist is that he should have the necessary quality of 'character' therefor. A strategist must be born as such. He who has not this necessary 'character,' will never be one. But it suffices not to be born to it. He must, especially now when so many sciences play a decisive part in the service of strategy, study much, if he does not live to see, as the strategists of olden times did, so many wars that he can replace study by plenty of experience, or, which is the same thing, by practical knowledge of war. But character and study even are not enough. The character must be steeled by roughing in the "whirlpool of the world," study must be refined by personal experience.

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I will tell you first how I intend to develope my views on strategy. * * * You know my preference for the inductive and my dislike for the deductive method. I purpose then to wander with you strategically through one campaign and then another and another and so forth. How far? I should say "ad infinitum," that we may be able to collect all the experiences that there are and draw from the sum of experiences lessons of the greatest possible latitude and certainty. Bronsart* says very rightly that only from a sum of similar experiences can a correct conclusion be drawn of their fundamental value. Therefore we must find the same experience repeatedly in the history of war, before we can deduct therefrom a definite lesson.

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On the other hand the strategical considerations of many campaigns will put us in a position to exhaust approximately all possible strategical situations and prepare us for those that we may meet with in the future. But in this we shall not fully succeed. For "the possible combinations are so manifold, that the same act of war, however small and insignificant, is never repeated in exactly the same way," as Blume* says most properly. Then he continues—"we seek the leading threads in the changeful aspects, which history brings before us, of war; we study the reason of the influencing forces as well as their relations to time and space, and exert ourselves to bring the results gained together under general points of view in order to get thereby foothold for suitable action in war. If then we have imagined ourselves in as many situations of war as possible and have examined closely into the leading motives for resolutions taken and to be taken, then when the time comes, the ground will no longer be entirely unknown and strange, we shall all feel ourselves at home, even if the position in which we find ourselves is not quite clearly the same as any of those we have strategically explored." "But we can only partially succeed in lifting the veil that lies over the secrets of war" says Blume further.

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* General-Major Bronsart von Schellendorf, present War Minister, and author of "Dienst des General Stabes."

This fact limits seriously the extent of the ground of our explorations. Of no use to us is the study of those wars, whose veil of secrecy is not raised by history at least as regards those influences that have worked as motors on the strategical decisions of the commanders So for our object those wars are useless which lie too far back to give notoriously sure information.

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Even the wars of Frederick the Great are only now being described by the general staff by means of documents and the help of the archives of both sides; their history therefore as yet does not provide sufficient ground work for our consideration. Besides, the strategy of the last century differs so greatly from that of the present through the difference in arms, army organization, and modes of supply, that conclusions drawn from what we see of it might easily, if applied to the present, become false conclusions. We are accordingly thrown upon the wars of our own century. And even of these there are many that we cannot yet turn to account, because "the veil is not yet sufficiently raised, that covers the secrets of war." Who will for example at present undertake to name all the motives that influenced the resolutions of the generals on both sides in the Russo-Turkish war of 1877? Why Osman Pacha did not push further forward, but entrenched himself instead at Plevna? Why the siege lasted so long?

You think, perhaps, that one can on this very account pronounce judgment as to whether this act or that was correct, that one can assert that it was a mistake of Osman Pacha that he did not push on up to the Russian bridge over the Danube, after he had repulsed the enemy the first time, &c. &c.

But that would be of no use to me in my object. I will not criticize. *La critique est aisée, mais l'art est difficile.* I will not examine as to whether this or that general made a blunder, or if a mistake occurred, whose fault it was, for this kind of dogmatical criticism furthers my Strategy not one whit. It was formerly very much the fashion. I learnt as a young lieutenant under the guidance of clever teachers to laugh at gross blunders of the most famous commanders. But that has not helped me in the least. Ever since Verdy* made us familiar with the applicatory method of investigation, our instructors broke with the system of dogmatical criticism. The knowledge of blunders which a Frederick or a Napoleon may have committed, is useful only so far as we conclude therefrom that strategy is not quite so easy to carry out. Then, we judge more leniently of stars of the second or third magnitude. We learn that all make, have made, and will make blunders, when even the greatest masters committed them. For a commander becomes greater than his opponent only by making fewer mistakes. For our object however it does not interest us to know whether Peter or Paul should bear the blame of this or that mistake; we only ask as to every blunder, not "who" but "what" was the cause, in order to learn what to avoid, how to act.

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* General-Major Blume—author of "Strategie eine studie."

If you are agreed, we will in this way consider a few campaigns, for which for this object of ours enough material lies at hand. It will suffice here to consider the development of the campaign up to the first decisive battle. After that, the veil that covers the secrets of war, is far too thick to clearly recognize the leading motives. When for example after a battle the pursuit is not sufficiently well followed up, he who reads of the battle can never judge of what the cause was. The condition of the troops, the temper of the leaders, and a crowd of circumstances bearing on these cannot be rendered in history, cannot be described, and many such circumstances no one will relate. * *

We content ourselves then with the consideration of the campaigns up to the first decisive battle, and when we have thrown light on the strategical points of a few such campaigns, or better, when they have enlightened us, then each of us can study for himself in like manner, alone, as many other campaigns as possible. So we will discuss every thing in strategy that relates to pursuit and retreat, base and communications, giving of orders and conduct of business &c. &c. and strive to enlighten it by historical examples.

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Perhaps it seems to you necessary to determine what strategy is, before I write about it. Strategy then is—no! the word has already been often enough defined. Clausewitz says, as is well known, "Tactics is the employment of troops for the ends of the fight, Strategy is the employment of the fight for the ends of the war." Blume calls Tactics all that relates to the use of forces in the fight, and to the direction of their action towards the objects of the fight, and he calls all in the art of generalship that does not belong to Tactics, Strategy.

In another place he says "The employment of troops for the fight belongs to the domain of Tactics and forms its chief contents. On the other hand the determination when and at what object the blow shall be struck, the preparation of the requisite forces as well as the realization of success belong to strategy."

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* Oberst von Verdy du Vernois.

These two authors, of whom the former has long been an authority, and the latter will probably soon become one, both put Tactics and Strategy into contrast. * * * There is wanting a definition of Policy in war, which according to Clausewitz' definition [of Tactics and Strategy] should run "Policy in war is the employment of war for the ends of the State."

Blume also gives some expression to the relations between Policy and Strategy. Policy, Strategy, and Tactics must go hand in hand, in close connection, if the result is not to suffer.

Blume thinks, one may say, that Tactics stand subordinate to Strategy. In the same sense Strategy stands subordinate to Policy. But the very opposite cases occur. Blume on this point observes very rightly that Strategy finds its limits in what is tactically possible and the result of tactical decisions is the chief factor with which strategy reckons. When therefore the result of tactical decisions falls short of or oversteps that which has been held possible, Strategy must be modified, and then stands subordinate to Tactics. Yet again is this the case when a tactical decision is sought for, and for its sake Strategy is given the task of uniting for the purpose as many forces as possible. For it is a well known principle that one can never be too strong for a decisive battle. Just as often has it happened that Policy stands subordinate to Strategy, although properly Strategy ought to have stood subordinate to Policy. The results of Strategy will limit or expand the aims of Policy, therefore Policy will be dependent on Strategy. Policy appears altogether subordinate to Strategy when the former demands that the latter meet half way or yield to a neutral in order to gain his strategical assistance.

But it also may happen that Policy steps into direct co-operation with Tactics. If diplomatic negotiations necessitate an appeal to arms to gain for themselves more emphasis, Policy may momentarily give orders for a fight which was strategically not necessary. A monarch who from tactical and strategical grounds was advised against the storm of a fortress, replied "whether we take this fortress or not may be tactically and strategically of no account. But I need the storm of a fortress in order to show the world that my troops can storm fortresses, that they may respect my army."

On the other hand it often happens that Policy becomes directly dependent on Tactics. Diplomatic utterance after a battle won is quite other than after a battle lost. But there are exceptional cases when Policy must wait on Tactics. Such an one I saw in 1864. Policy forbade us to cross the boundary between Schleswig and Jutland. Arrived at this boundary we found in front of our outposts the commanding position of Kolding, which belonged to Jutland, not held by the enemy. It was tactically quite impossible to neglect to hold this dominant position, unless we wished to see the position of our troops, especially of the advanced guard, seriously endangered. Tactics therefore compelled us to the immediate seizure of Kolding, and Policy, that is to say diplomatic negotiations were obliged to procure us indemnity for it afterwards. Just the other day a like case occurred at the boundary between Merv and Afghanistan. Komaroff could from tactical grounds not endure the Afghans surrounding him near Panjdeh. He fought them, and Policy was afterwards obliged to justify what he had done and to assume for itself objects that fitted in with this act of tactical procedure.

If now Policy, Strategy and Tactics must always go together hand in hand, it is evident that the greatest success must be attained where the highest political, strategical and tactical authority is united in one and the same person. For us Germans after the wars of 1866 & 1870-1 there is no need of proof of this. That Policy must go harmoniously hand in hand with Strategy and Tactics, seems so simple and clear that the wonder is, how often this main condition has been erred against. In 1806 the failure of Prussia, in 1859 that of Austria, in 1870 that of France was the consequence. In all these cases the command of the Army and the Government, that is, Policy and Strategy were not in the same hand.

The General Staff is to Strategy what Diplomacy is to Policy. What the Government wills, it is the business of Diplomacy to carry out, what the Commander-in-Chief wills, it is the business of the General Staff to carry out. The activity of the General Staff forms accordingly just as essential part of Strategy, as that of the diplomatic corps does of Policy. * * * * *

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It is not sufficient to know all about the organization of our own and foreign armies, about distribution of orders, dispositions, instruction, tables of operations, and reports of all kinds about marches, camps, cantonments, bivouacks, rations, reserve of arms, ammunition, and clothing &c., to be able to reconnoitre and sketch, to be well up in battles and combats; the strategist must be well informed upon railways, telegraphs, and hospitals, he must understand statistics in order to measure the capacity of a country for bearing imposts and requisitions, indeed he should know how a conquered country has to be governed, until the requisite staff of civil officers arrive. He must be perfectly at home about fortifications. It is not necessary that in strategy there should be a complete and fundamental knowledge of all these branches of knowledge. For example the strategist need not be an engine-driver or constructor of works of fortification. But he must be in a position to judge of the capacity of railways, and to measure the value and power of resistance of every fortress as regards position, construction and garrison.

* * * * * *

I do not think that you expect me to lay down a regular accurate system of strategy. Systems of the kind that are said to be good for all cases, like some universal medicine, certainly have been laid down by authors. For instance, the strategy of the "interior lines" which proved so brilliantly successful with Frederick the Great, and yet was only the result of his position, surrounded as he was by enemies. When the allies in 1813 surrounded Napoleon on all sides and hunted him to death, a "concentric" system was instituted. Out of the way in which the Germans were led in 1870-1 it will hardly be possible to deduce a system. To begin with, when they drove their masses in like a wedge between Bazaine and Macmahon, they appeared to adopt the system of the "interior lines," afterwards in the actions that are known shortly by the names of Metz and Sedan, the "concentric" system. Lastly one might again speak of a strategy of the "interior lines" in the campaigns conducted at that time in every direction during the siege of Paris.

Yet there are axioms for strategy which must be fast held to in war. Of these I should like to lay down five:

1. Policy must go hand in hand with strategy in the closest connection.

2. The first and foremost endeavour must only be to overcome the enemy's fighting power. Everything else, possession of provinces, cities &c. ranks only second.

3. One can never be too strong for a decisive battle. The efforts of strategy are to be directed to bringing for this purpose as many forces as possible to the spot and never to employ more on collateral objects than are absolutely necessary.

4. One should never bind oneself to a definite system, but must always let sound common sense prevail, and do that which brings one to the object aimed at by the shortest path.

5. Changes in strategical dispositions lead to incalculable loss of time and strength. When therefore events, whether they arise from the side of the enemy or from natural causes, do not make such change necessary, it must be avoided. Sudden unreasonable alteration in the general's intention has often led to the greatest disaster. The Best is the enemy of the Good.

But even with the closest following out of these strategical axioms every war will always be a hazard. On this account Strategy must give up feeling perfectly sure beforehand of the result. The strategist who is not resolved to dare, cannot aim at great success, and just because war is a hazard, he had better leave war alone altogether. When to dare and what to dare is the matter for deliberation.

In this it does not do to run off in one direction, but *all* eventualities must be considered. Nothing, not even the most marvellous in the enemy's moves, should take the strategist by surprise. He must have weighed every possible contingency beforehand and have the antidote ready at hand. For this is needed a power of control that is given to but few men, a vast comprehensive mind allied to a strong character.

Thus alone can the strategist attain the object of all strategy, to give the law to his opponent.

In no strategy has this been in so masterly a manner brought out in practice as in the conduct of the German Army in 1870-71.

The strategical axioms I have named will remain in force so long as present ideas of War and Peace, Policy and Strategy hold good. Even inventions of new means of warfare (steerable air balloons) will cause as few changes as the latest inventions hitherto (railways, telegraphs, rifled guns, dynamite &c.,) have brought about.

You laugh perhaps at my thinking that ideas of War, Peace, Policy and Strategy might change. This opinion has come to me only of late.

We have seen a campaign without preliminary declaration of war and without subsequent conclusion of peace (Alexandria, Egypt.) In another region of the globe a war has taken place under constant assurances from both parties that they were not waging war and were at peace with one another. Yet afterwards they thought it necessary to conclude a peace with one another (Tonquin, China and France.) Finally we have lived to see a fight, when there was no war (Panjdeh) A like case though, certainly, did take place more than 30 years ago (Bronzell.) Upon phenomena of this kind I must keep silence in my considerations of Strategy. They do not come within their reach. But such phenomena have aroused in my mind the thought that some day quite other meanings might be attached to the words War, Peace, Policy and Strategy.

PART I.

The Campaign from the 8th to the 14*th October* 1806.

LETTER 2.—INTRODUCTION TO THE CAMPAIGN.

You have declared yourself agreed to the mode suggested by me. Then I will start off here with any campaign you please. No! Not with *any* campaign. I choose by preference the campaign of 1806. Firstly, because failure is more instructive than success. Secondly, because it is certainly one of those of Napoleon I. which boasts of the most tremendous and the most surprising, as well as the most important results obtained by that commander; thirdly and lastly, because in its events, causes, and motives, its true history is very clearly established, certainly in one work, which has made use of all available sources with the greatest conscientiousness and care, that of Höpfner. We can therefore conveniently follow the course of these events.

This campaign too is one of those, in which Napoleon I, by his simple strategy, directed only to the destruction of his opponent, completely threw over all the earlier received theories of the art of war. In this campaign the great Master of the day fought against proved brave leaders of second and third rank of the old school. For this very reason the campaign is most instructive.

Comparative Strength.

The whole fighting strength of the Prussian army amounted to 247,724 men, that of the Saxon army to not quite 50,000 men, that of the allies together then not 300,000 men.

The forces of Napoleon amounted to 560,000 men, to which were added further 90,000 Dutch, and troops of the Rhenish confederation, in all 650,000 men.

Of these forces on both sides the following were employed in the operations up to the catastrophe of the 14th October.

On the side of the Allies 128,000 men, about a day's march behind whom followed the weak reserve Corps of the Duke of Würtemberg; and on the side of Napoleon about 200,000, behind whom came over 80,000 men more.

Napoleon therefore was superior to his opponents in his whole force, as well as in the masses available for the first collision, and in the proportion of 2 to 1.

As regards the goodness of the troops, the Prussian army was certainly animated with an excellent spirit and trained in admirable discipline. But its tactics were still almost the very same as had been tested in the Seven Years War.

In the course of the war it proved that the Prussian infantry tactics with its stiff line formation was little able to adapt itself to every kind of ground, and that the French tactics of skirmishers thrown forward in the front of advancing columns could make head against double the number of Prussian infantry.

To the employment of artillery, especially in masses, the Prussians at that time paid small attention. The French had already had experience of it (Austerlitz,) although Napoleon seems to have raised such an employment of artillery in masses to a system only since Senarmont's success at Friedland.

The Prussian cavalry was excellent and even superior to the French in numbers, although they had here and there a few commanders who were growing old. Yet Napoleon warned his army of them in an order of the day. Their leaders had not yet knowledge of the difficulties that meet cavalry attacking, on intersected ground, unshaken infantry, who understand how to use such ground, with skirmishers and supporting columns.

The command of the Prussian army certainly lay nominally in one hand, namely that of the Duke of Brunswick. But he was obliged to get an assent to all measures from the King, to whom many other personages, even subordinate commanders, had access and with whom they found a hearing. The consequence was many consultations with the subordinate commanders or their chiefs of the staff, in which time was lost and through which the views of the Duke were greatly thwarted. The command of the Prussian army consequently lacked uniformity. Besides, the ties that bound together Prussia and Saxony could not be called strong. On the very evening before the catastrophe the Saxon commander-in-chief refused his obedience to a command.

Opposed to an army thus led stood Napoleon with his strong, uniform, dictatorial authority. His fame as a commander had wrung from his army an immovable confidence in his leadership. His generals trembled at his recklessness, yet seldom dared any one make a remonstrance against a wish of his.

The organization of the commands in the Prussian army was made more difficult by much detail. A distribution into Divisions, which had been hitherto quite unknown in the army and even at the opening of the campaign had not been fully carried out, aggravated extraordinarily the difficulties of leadership. Minute army orders were necessary, which had often to be taken up with directions for single battalions and squadrons and absorbed much time in reading and writing. Much, too, had to be issued from head-quarters, which in an army manœuvring in an organization to which it is accustomed, are a matter of course, such as details for outposts, patrols &c.

In contrast with this the French army moved in a strong organization familiarized by war. Napoleon had only to direct on what roads and how far the corps had to march. All the rest the Marshals looked to themselves. Only here and there when he lays especial stress on a matter, does he in his orders touch upon details, such as information, security, or points out dangers to his generals and warns them to be careful (Lannes at Saalfeld.)

It is evident how much handier and more mobile the French troops were through this organization of command.

The mode of supply formed a still heavier leaden weight on the feet of the Prussian army in the field. This was still managed according to the principle of magazine supply in vogue in the Seven Years War. Certainly it now and then appeared in orders that single detachments of troops were directed to get their supplies at this or that village. But this was so new and uncustomary in the Prussian army, the troops knew so little how to make regular requisitions, that not seldom the Prussian troops found nothing in the villages and starved, where after them the French fared sumptuously. Certainly the Prussians were in their own country where threats and drastic measures would not be very willingly resorted to, so that more time was lost in requisitions and smaller results obtained. It came to this that there existed no regular organized connection between the commissariat and the army leaders. Often the commissariat experienced untimely changes in the movements of the troops and sent the supplies in wrong directions. Then the troops starved.

The French army had accustomed itself to the circumstances of war on the principle that war must feed war. For more than ten years it had been almost constantly at war. It had practice and regular routine in the collection of requisitions, contributions, and the like. It lived on the district in which it was cantoned. Napoleon at the same time did look to magazines of stores. In particular, he used to have bread baked. Several of his orders are on this subject. If his army marched through a district, the neighbourhood all looked as if a swarm of locusts had infested it for a while.

We read further that the Prussian army was inadequately clothed and armed. The infantry had no great coats to bivouack in: and the complaints as to the defective quality of the arms are well known.

The French army however was fully and completely provided with all necessaries.

Finally the capabilities of the leaders remain to be noticed. There were probably among the Prussians just as many clever and observing men, perhaps even more than among the French, but they were for the most part aged and by reason of their infirmties not up to the hardships of a campaign. This delayed many an operation, for the leaders were not always able to carry out their orders immediately. Thus, one of the generals came to the council of war at ½ past 10 on the 13th October instead of before day light, because he had first to wait for his "morning sweat" (morgenschweiss) and thereby delayed the decampment of the whole army.

The French generals were all young, strong, and inured to war. Most of them were between 30 and 40 years of age. The Commander-in-Chief, the Emperor, was 38.

If all these points are taken into consideration, we arrive at the conclusion that in the year 1806 the Prussian army, in spite of its excellent spirit and magnificent discipline, compared badly with the French, and that if the numerical proportion was as 1 to 2, the real proportion of strength is to be assumed as 1 to 3, if not 1 to 4. The success of Davout at Aueretädt against the immense superiority in numbers of the Prussians, in spite of the unfavourable tactical position, in which he had to debouch through a narrow defile in front of the enemy, confirms this assumption.

Whether Napoleon judging by his first strategical measures for the war of 1806 was fully aware of this immense superiority is more than doubtful. He feared, as has been said and as is proved from many of his orders, the excellent Prussian cavalry. He repeatedly used great prudence in his operations up to the defeat of the Prussian army on the 14th October. But several expressions in his letters and directions to the generals and the troops prove that he was certain of the ultimate result: "Il parait qu'ils veulent avoir une lecon—nous ferons une campagne comme celle d' Austerlitz—Nous ferons une belle campagne"—Such expressions found ground enough in actual facts.

The Initiative.

According to the historical researches of Höpfner the decision for war was come to at Charlottenburg on the ground of the arrival of the courier who came in from Paris on the 7th August 1806. He brought a despatch from Lucchesini* saying that Prussia had only war or hard terms to expect from Napoleon.

On the 9th August orders for the mobilization of the army were issued. The disproportion of strength was well known in Prussia. The Commander-in-Chief, the Duke of Brunswick, considered a successful issue of the struggle impossible. But the national honour was so deeply hurt, that Prussia was compelled to grasp the sword, and to such a degree, that one might almost say she was driven to war through despair.

Napoleon had so small an opinion of the power of Prussia, that he clearly seemed to have believed he could demand anything of the country and it would nevertheless not fly to arms. For even on the 26th August he wrote to Berthier about the Prussian armaments: "ridicules armemens, auxquels il ne faut donner aucune attention" and discusses the return of the army to France from Bavaria "je n'ai pas moins d' impatience que vous et l'armée de vous revoir tous en France."

He had straightway concluded a treaty of peace with Russia and was negotiating with England.

At the beginning of September he had the news that Russia had not ratified the treaty. He wrote at once to Berthier to reconnoitre the roads from Bamberg to Berlin, and to make all such preparations

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* The Prussian Ambassador at Paris.

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We read further that the Prussian army was inadequately clothed and armed. The infantry had no great coats to bivouack in: and the complaints as to the defective quality of the arms are well known.

The French army however was fully and completely provided with all necessaries.

Finally the capabilities of the leaders remain to be noticed. There were probably among the Prussians just as many clever and observing men, perhaps even more than among the French, but they were for the most part aged and by reason of their infirmties not up to the hardships of a campaign. This delayed many an operation, for the leaders were not always able to carry out their orders immediately. Thus, one of the generals came to the council of war at ½ past 10 on the 13th October instead of before day light, because he had first to wait for his "morning sweat" (morgenschweiss) and thereby delayed the decampment of the whole army.

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in the army that eight days after orders received it could be concentrated at Bamberg.

When in this same letter he says that he reckons on being able to reach Berlin from Bamberg in 10 marches (50 German miles,*) he seems not to have taken the map into consultation, even if he believed that the Prussian army could present no opposition to him.

Napoleon still seems not to have believed in war. For on the 10th September we wrote to Berthier: "Si je me brouillais avec la Prusse, ce que je ne crois pas, mais si jamais elle en fait la folie."

It was only on the 19th and 20th September that the guards left Paris (mostly in waggons) for Mainz. Napoleon at once wrote to Berthier on the 20th the orders for the execution of the projected concentration of the army at Bamberg and he again issued orders for the purpose on the 24th September. The concentration was to be completed on the 2nd October.

The thoughts that guided Napoleon are to be divined from these dates. Prussian armaments in themselves disquieted him not in the least. He had seen Prussia arm and disarm. Even if he was in possession of the draft of Lucchesini's despatch above mentioned, he might still perhaps think it possible that Prussia would not follow her ambassadors's advice. In fact General von Knobelsdorff who was sent to Paris in Lucchesini's place seems to have succeeded in putting Napoleon off with assurances, for he (Napoleon) writes as late as the 10th September to Berthier: "Mons. de Knobelsdorff me fait toutes protestations, mais je ne vois pas moins continuer les armemens de la Prusse, en vérité je ne sais ce qu'ils veulent.

But as soon as Napoleon put credence in an alliance between Prussia and Russia and in the earnest desire of the former power for war, he formed a resolution to crush Prussia quickly before Russian assistance could arrive on the ground.

What news matured this resolution, is not to be found in Höpfner's work. But the facts speak for it that Napoleon on the 18th or 19th must have received some such report. For it was not his way to waste time for no reason.

At any rate the following dates are established:

Prussia resolved on war on the 9th August, Napoleon on the 19th September.

Consequently Prussia had the political initiative.

Thereby she gained six weeks start. Of most of this time Prussia had pressing need, for she had first to mobilize her troops, in those days a work of much time, whereas Napoleon's army for the most part was already mobilized in what we now know as Bavaria, where they had been halted on the march back from the campaign of the year before. Only the guards were in Paris, but they were ready to march at any moment. Yet the start which Prussia had gained was really immense. Berthier's first orders for the concentration of the army followed (24th September) at a time when the Prussian army already stood with the principal forces united on the Saale and Mulde.

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* 1 German mile is usually reckoned at 4½ English miles. Where miles are here mentioned, German miles are meant. Bomberg is about 50 German miles south-east of Berlin.

According to the orders for concentration the following positions were taken:

Bernadotte on the 2nd October at Bamberg;
Soult on the 4th between Amberg and Schwandorf;
Davout on the 3rd at Bamberg;
Ney on the 3rd at Ausbach;
Lefebvre (Lannes) on the 3rd at Königshofen (altered later to Schweinfurt;)
Angereau on the 2nd at Frankfurt, advanced guard at Giessen;
Murat with the Cavalry Corps on the 3rd at Erlangen, Windsheim, Mergenheim, Schweinfurt, and Aschaffenburg.

Napoleon himself entered Mainz on the 28th September and remained there till the 1st October waiting for the guards from Paris in order to march with them to the army.

These measures form the simple concentration of the six army corps, which had been scattered about in Bavaria (up to the Inn), Würtemberg and Southern Hesse, and forwards towards the frontier of Prussian Electoral Hesse. These movements before the beginning of regular operations of war are called the strategic advance [Strategischer Aufmarsch.] But as yet there was no talk of a strategic system of operations [Strategische Kriegs-massregeln] as no decision had yet been arrived at, how and where they expected or purposed to strike the enemy.

Napoleon placed his troops only so close together as was possible up to the moment, and so far apart from one another as was demanded having regard to their existence and living on the country. The line from Giessen to Bayreuth may be regarded as the front of this position and amounted to 29 German miles "as the crow flies".

The strategic advance of the Prussian troops was completed, as has been said, on the 24th September. But whilst Napoleon in his advance allowed as his single guiding motive a simple drawing together of the army from where it was already lying, by the shortest routes towards the enemy, the advance of the Prussian troops aimed at covering their far stretching frontiers in all those directions which led to the enemy's territory. Diplomatic political considerations, especially the desire of moving Electoral Hesse to effective assistance, likewise occasioned a separation of the forces. The Saxons were not yet ready with their armaments and were to be ready at Zwickan by the 5th October.

Accordingly towards the latter third of the month of September the Prussian Saxon army was divided in such a way that a considerable portion (Rüchel and Blücher) lay towards and in Electoral Hesse and from Paderborn to Eisenach-Gotha-Erfurt; the main army in the neighbourhood of Naumburg, and the army of Hohenlohe between the Mulde and the Elbe, after the latter stream had been crossed between the 12th and 18th September; the Saxons, as mentioned, were still mobilizing. The extent of front amounted to 40 miles "as the crows flies."

We see from what has been said that the political initiative was on theside of the Prussians and gained them so much time that after

the completion of their mobilization they still could have had a start of eight days for a strategic initiative, if they had not waited for the Saxons to mobilize. But then they would have had to begin the operations with about 20,000 men less.

The Plans of Operations.

The plans of operations of both sides are based on the strategic advance.

If you held in mind or had studied only the events of the last wars of 1866, 1870-1, or were to forget what you know of older campaigns, you would think that in the year 1806 each of the contending parties must now have taken measures for striking the enemy in his most vulnerable poit. To effect this each party would have had to procure knowledge of the position, strength, and condition of the enemy's army and to have taken their own measures accordingly.

That however neither party did. Both sides lived in a state of extraordinary ignorance of one another. One is most surprised to observe this in Napoleon. For Prussian accounts and memoirs complain of the numbers of French spies and Napoleon had moreover ordered officers to be sent from Bamberg to Berlin and Dresden. One of these officers he had himself instructed: "On dit qu'il y'a entre Dresde et Berlin une ville appelée Torgan qu'on dit être fortifiée. Il faut la reconnoitre." A proof of what geographical ignorance they were in in France about their enemy. Again on the 5th October Napoleon writes to Marshal Soult:—"Since the enemy is said to be at Erfurt with his main body." He had therefore no information of the distribution of his enemies into three armies, which at this time lay at Eisenach, Erfurt, and Jena. Even his masterly dispositions in the afternoon of the 13th for the battle of Jena were based on the supposition that he had to do with the whole united army of the enemy.

On the Prussian side they were altogether without spies, but by chance they received early in September fairly correct information about the position of the enemy in Bavaria, Suabia, Württemberg, and Hesse, and calculated accordingly his forces at something over 200,000 men. As to the plans possible, they certainly yielded to some illusions, for it was thought that Napoleon would have to split up his army, let some army corps stand inactive on the Inn towards Austria, and act with one against Hesse.

Later, up to the 10th October, they were pretty well informed as to what was going on, by the cavalry detachments pushed forward. Travellers and the inhabitants too seem to have brought more news from the French army to the Prussians than from the latter to the former. From what the King wrote to Rüchel on the 7th October it appears that the King knew of the movements which Napoleon had carried out with his corps, from the 2nd to the 5th October, into those positions in which he granted them two days of rest. The King accurately guessed too in this letter what Napoleon's intentions were.

It is in the highest degree interesting to observe how with their meagre information about each other both sides made their strategic dispositions.

Napoleon marched off in a direct line upon Berlin from the centre of his army. This course was in keeping with the only object that he could have entertained, namely to crush the power of Prussia as quickly as possible, before Russian assistance reached the spot. On this account he marched in as close formatiom as possible, convinced that the enemy's army must oppose him somewhere on the way. He wished certainly to act with speed, but he did not strive after speed at the cost of the power of the blows that he wished to deliver. So he first united all his forces, then gave his army two full days of rest, that it might recruit it's strength for the exertions that lay before it, and then set it at once into motion on three adjacent roads.

On the road to the right, Amberg—Hof, marched the IX. corps (Soult), half a day's march behind them the VI. corps (Ney), then followed the Bavarians under Wrede. This column was in all 60,000 men strong.

On the middle road, Lichtenfels—Kronach—Lobenstein—Schleiz, Napoleon set the I. corps (Bernadotte), half a day's march behind them the III. corps (Davout) and a day's march behind [the I. corps] the guards under Lefebvre. This middle column counted 90,000 men,

On the road to the left, Bamberg—Coburg—Gräfenthal—Saalfeld marched the V. corps (Lannes), and half a day's march behind them the VII. corps (Angereau). Then followed Victor with the troops of Hesse-Darmstadt &c. This column was 46,000 men strong. In front of the army marched Murat's cavalry.

(Up to the 8th October all conflicts with the Prussian troops were to be avoided and everywhere the most peaceful intentions expressed.)

On the 8th October the head of the right column reached Müncheberg, that of the centre a point about half way between Kronach and Lobenstein, that of the left, Coburg.

The heads of the columns therefore included a front of 8 miles. The depth of the columns may have amounted to about the same.

Three corps at the most marched on the same road. Several of these corps had to follow the ones that preceded them by half a day's march. This however is always accompanied by great difficulties, because one corps forms a marching column one day's march in length. so that a corps following at half a day's march interval can start only in the afternoon, if the leading corps starts in the morning. For this reason Napoleon imposed this duty only on the corps marching in the middle [second in order.] The third corps kept a whole day's march distance. Consequently the marching depth was two and a half marches in length, that is, 8 miles, and so the army of 200,000 men in cantonment covered an area of 8 miles by 8 (64 square miles) and moved forwards in this formation from the 8th October three or four miles a day. In his letter to Soult of the 5th October the Emperor calls the marching formation which he had ordered, a battalion square of 200,000 men. Each soldier was provided with bread for four days.

Napoleons arrangements for this plain simple advance, which dispensed with all other combinations against the enemy and was only calculated upon for being at any time and in any direction ready for collision with the enemy, give us matter for consideration on many instructive strategical points.

He wanted to march in as close order as possible. That object however the experienced general knows he can attain, not by marching perhaps on one single road, but by taking up on the march as much front as depth, By this means he is able to concentrate the whole army at any moment in the shortest possible time at the threatened point, be that where it may.

This mode of marching we find again in the advance of the II. and III. German armies through the Palatinate in the year 1870. A glance at the sketch map given in the work compiled by the general staff for the evening of the 5th August 1870 shows us these 9 army corps with a front of six miles from Bettingen by Neunkirchen to Einöd and a depth of 6 to 7 miles. They were able to march in somewhat closer order than Napoleon in 1806 because they could use more roads.

It is also by this proved advisable not to let more than three army corps march behind one another on the same road. Three corps following each other are quite difficult enough to move forwards. For if they all march at the same time, they cover the road for 8 or 9 miles. The waggons which bring up the supplies of food are therefore almost 9 miles from the foremost troops and cannot reach them for certain at the right moment, when they are in distress. Therefore one can march in such deep column only so long as the supplies last which the troops carry on them ; except when sufficient provisions are to be found in the district. That however can never be known beforehand. In the year 1870 the army in the country of the Palatinate would on this account have suffered from the 5th to the 10th August the greatest privation, had we not had a railway, on which provisions could be brought up. Near this railway itself therefore it was possible to venture to let as many as four army corps follow one another on the march, as this sketch map shows.

In some points Napoleon's plan of operations at the beginning of the war of 1806 will not bear the standard of criticism which one would apply to a plan of operations after the experience of 1870.

First of all we miss a pushing far forward of great masses of cavalry in advance of the army to bring in reliable information of the enemy's forces. To be sure Napoleon did give orders that Murat's cavalry were to march in front of the army. But the distance they penetrated forwards was not great, we can trace how it was that at the first contact with the enemy, both against Tauentzien and against Prince Louis at Saalfeld, closed bodies of infantry followed close on the foremost points of the cavalry. There is no mention of a push forward of cavalry one or more day's march in front of the infantry, as was striven after in 1870 with the German army.

In the case of a genius like Napoleon's which in 1806 had already become masterly by plentiful practice in command of armies, it would be ridiculous for me to give utterance to blame only. It is more instructive to examine into reasons. So first of all I will refer to Napoleon's intention of preventing any collision with the enemy until the 6th October, as is most clearly expressed in his orders. He apparently wished to collect his whole strength first close by the frontier of the enemy's territory under the most peaceful assurances, in order to heighten the force of his heavy blows by surprise. The enemy had however put out his foremost feelers as far as Coburg, and that place Murat reached in his first march and gained some start.

But also in the further operations up to the battle of Jena-Auerstadt from the 8th to the 14th October, you will be able, as I here point it out in anticipation, to observe that the French cavalry did not venture very far in advance of its infantry and was therefore able to bring in only unsatisfactory information of the enemy. Only after the battle of Jena-Auerstadt, after the enemy's forces had been utterly defeated, did the French cavalry in pursuit of the Prussian infantry press far forward and bring in the fruits of the victory.

One reason for the cavalry thus clinging to the slower marching infantry you find in Napoleon's letters to his generals, especially to Soult. Apprehension of the Prussian cavalry is observable throughout, Napoleon knew how good they were. He knew the weakness of his own horse, which although numerous, yet in no way equalled the Prussian in energy. He gives instructions as to how the infantry were to behave before the Prussian cavalry. (Letter to Soult of the 5th October: "What is most to be apprehended on the part of the Prussians seems to be their cavalry.") Here you see strategy was fettered by the elementary tactical condition of the troops. He therefore wished to risk his inferior cavalry, only if the Prussian cavalry had first shattered itself against the infantry. He seems to have desired to represent Prussia as utterly weak, utterly insignificant. He would allow his opponents not the smallest success, not even in the first contact of the advanced troops at the very commencement. There we recognize the leader who knows the human heart. The first success in war, be it ever so small, is of incalculable value. If the first insignificant skirmish with the enemy proves glorious for one's own troops, the whole army feels itself elated by the news. All pant to win equal glory. But if the first collision with the enemy turns out unfavourable, if once the whole army adopts the idea that it is possible to give ground to their opponent, the humour of the men becomes quite different and the inclination for the fight suffers.

That Napoleon made two cities, Dresden and Berlin, and not the enemy's forces, the object of his first plans of operations may have been a consequence of the insufficient information he had of the enemy's army. I have already mentioned to you, that in his letter of the 5th September to Berthier, he says, that he wishes if it comes to war, to concentrate at Bamberg and reckons upon marching to Berlin in ten days. In his letter of the 5th October to Soult he only mentions an advance upon Dresden. He does not say much about the disposition of the enemy's army. That the great Leader here for once made geographical points the aim and object of his operations without regard for his enemy's strength in the field, is all the more astonishing, as he had never so acted before. Not a year ago he had opened the war against Austria by uniting the whole of his forces against Mack's army. And it was he too who had drawn the lesson from the wars of the Republic that the first thing to do was to overpower the enemy's forces, and that only then could it be a question of taking provinces and cities. He had broken with the theory of the 17th and 18th centuries, which made the possession of provinces, positions and cities the first rule of strategy, and regarded the battle as a secondary consideration, a theory, from the fetters of which Frederick the Great alone hitherto had often freed himself. The more astonishing Napoleon's strategic objective in 1806 seems to me, the better is it worth our while to look for the reasons which may have moved him to neglect the rule of action he had hitherto followed.

His desire to reach Dresden quickly had incontestably its grounds in the wish to detach Saxony from her alliance with Prussia, whereby the strength of Prussia must have been as much weakened as that of France increased. Later events make this purpose of the Emperor's clear. Here therefore you see how political considerations are able to modify even the principles of strategy which are generally held to be irreversible.

As regards the march upon Berlin of which he speaks in his letter of the 5th September, I am inclined to believe that he reckoned upon the enemy being obliged to fall upon him somewhere, if he pushed forward in the direction of Berlin with his "battalion square of 200,000 men." He felt himself so superior to the enemy with his veteran infantry and artillery that he thought anything else but victory impossible, however and wherever he might encounter his opponent, if only he marched so concentrated that he could unite his forces at any time for a decisive battle.

Had he had positive knowledge of the main forces of the enemy, he would certainly have made them the object of his operations. All reports and memoirs of that period tell of the numberless spies of Napoleon who infested the Prussian army. But the reports of such spies come to hand generally two or three days later than they are despatched. So that they can never supply the place of reconnaissances by cavalry, who bring in news of what has occurred on the self same day. Bnt as I have already mentioned, Napoleon did not consider his cavalry capable of strategical far-reaching reconnaissances with the Prussian cavalry opposed to them.

It is not to be assumed that the Emperor entertained the idea of marching on Berlin without a battle. In his letter to Soult dated 8 A. M. on the 10th October he expressly says: "I desire above all things a battle——it is not impossible that he (the enemy) will attack me—after this battle I shall be in Dresden or Berlin before him."

It is not conceivable that Napoleon deluded himself with the hope of ending the war with the taking of Berlin. He had a year ago marched into Vienna without forcing Austria to make peace. But after overpowering the enemy's army the possession of the enemy's capital would put the means into his hands of systematically wearing out the enemy's country.

If Napoleon however expected to compel Prussia to make peace by his entry into Berlin, he certainly deceived himself, as history shows.

If I now turn to the Prussian plan of operations, you will probably say that that will be easy to criticise. It has been just as much condemned by public opinion and in many works as by its events. If a battle has been lost, if a whole war has led to the prostration of a country, it is easy to discover that blunders have been committed. It is also not difficult to point out what these blunders were. But not much is to be learnt from that. The main point is to examine into and recognize what circumstances have led to these blunders; only thus can one learn how to avoid them in future. For who would wish to boast himself naturally more intelligent than the Prussian generals of 1806? They were men of weight, tried and experienced in many wars. * * * You will agree with me that at the first glance it appears extraordinary how such intelligent men could have made such tremendous strategic mistakes. So we will examine into how they came to make these mistakes.

I have shown above that the Prussian-Saxon forces stood in the proportion of 1 to 2 with those of Napoleon, and that this disproportion was considerably heightened by the superiority of the French tactics and the experience their army had of war. Of the superiority of the French tactics the Prussian leaders had no knowledge. The line tactics of the great king were to them still the criterion of all principles. They had no inducement to dissent from them. For these tactics had in the wars with the French Republic led to right glorious days. The light infantry tactics of the French army may have seemed to them rather as an outcome of revolutionary disorder which would not be able to stand before the strict discipline of the Prussian line tactics. There remains, if we wish to impress ourselves with the spirit of the Prussian generals of that day, only to bring into calculation the numerical superiority of the French forces. This was known to the Prussian authorities, as Höpfner's work proves, and accordingly we should be inclined to declare it a political error that a war was ever begun that had no prospect of success. Napoleon had throughout no intention of forcing Prussia to fight. This is sufficiently proved from his correspondence, according to which he even up to the 5th September would not believe that Prussia could entertain hostile intentions. The fact was, he had by his want of consideration actually driven Prussia to war. But that had not been the object of his conduct. Only after the figure cut by Prussian politics in the year 1805 he considered her power so insignificant and her Government so irresolute that he did not think it necessary to have any further consideration for her.

By his want of consideration however he mortified Prussia's national honour more deeply every day and drove her to war. It might perhaps be asserted that Policy must reckon with coolness and judgment and should not allow itself to be influenced by feeling and inclination, by regard for honour and sympathies. But what forced us then in 1870 to draw the sword? Nothing, but injury to the national honour!

It might be said that in 1806 Prussia had perhaps been obliged to declare war, but ought first to have made herself as strong as Napoleon was. To the excuse that Prussia was too small and too poor, you might object that in 1813 she was still smaller and totally impoverished, and yet developed a colossal strength, a greater than in 1806. That she could not come forward in greater strength in 1806 was due to the whole constitution of the state. According to the fashion of the 18th century the war that Prussia waged even in 1806 was a personal matter of the king's. His army was his property, the money that was required for the war was in a certain sense the king's money. On the other hand France put forth the resources of the whole nation. Arisen from a revolution that had brought into expression the will of the People, Napoleon in spite of the despotism with which he enslaved France, found everywhere willing advances and obedience and inexhaustible resources of men and money. For he preserved the form and knew how to bring the country to believe that it approved through him as its representative the Emperor's measures. Here we see strategy dependent not only on War Policy but even on the domestic political circumstances of the country.

The very opposite was the case in 1870. Then all Germany joined in the struggle. Through the law of universal service the whole nation took a part in the war. The constitution however of the French army approached more nearly to that of the standing armies of the last century. In consequence of this Germeny was in 1870 able to apply numerical superiority to the first decisive blows.

In spite of all these considerations I cannot hold the opening of the struggle of 1806 to have been altogether prospectless, so far as the reasons are based on numbers only.

If they had succeeded at the very beginning in scoring some considerable, even if only partial successes, they might have hoped to quickly strengthen themselves. The Elector of Hesse would then have abandoned his doubtful attitude in Prussia's favour. Austria showed herself not disinclined to renew the struggle, if she saw any prospect of success, and many another prince of the German Empire was only waiting for a chance to throw off the heavily pressing yoke. After the first successes there might therefore have been a hope of equalizing the balance of strength. And then the entrance on the scene of Russian troops must have decided the victory.

But a first success had to be won, and how was that to be done? By surprise alone and by concentration of the whole force at the decisive point. This the King had in mind, as every thing tends to show. For this reason he kept the French Emperor in suspense. Resolved since the 9th August on war he succeeded in keeping Napoleon in uncertainty about this resolution until the middle of September and in gaining time for armament and concentration.

Of this advantage which the political initiative had given Prussia, use might have been made either by pushing forward with united forces by Eisenach upon Frankfurt, breaking in upon the French Army Corps there and threatening the line of retreat and communications of the remaining corps distributed about on the Inn and in Bavaria. This course held out the prospect of carrying the Elector of Hesse soon along with it and of strenghtening the forces with his troops. Or else, the nearest French Corps might have been attacked by way of Hof and overpowered. This course was less dangerous, because by the other the Prussians could be more easily threatened in their own line of retreat. It was moreover the more natural course, because they had their line of retreat right behind them. It covered the still wavering Saxons and kept closer to Austria of whose assistance they had hopes.

What happened instead on the Prussian side? They hesitated long between these two courses, and instead of uniting the forces distributed them from the Baltic by Padersborn and Eisenach and along the Thüringer Wald to Hof and Saxony, in accordance with the theory of covering provinces and of operating through strategical positions.

This strategy which made the holding of countries and taking up of positions the chief object in view, was the result of the historical development of wars. In the days of the Condottieri of the 15th century people did not generally fight at all but only forced one another out of positions. In those days there were decisive battles, in which history records that two men were suffocated in the crush. Else there were neither dead nor wounded. For the Condottieri were for hire, to-day here, to-morrow there. The opponents of to-day fought perhaps as comrades to-morrow. On either side therefore their interest was to keep soldiers alive who brought them in money and had cost them money. When now Charles VIII put an end to such traffic in Italy by his campaign at the close of the 15th century, it still remained the interest of monarchs, who paid their standing armies out of their own pockets, as far as possible to avoid battles, and as long as possible attain the object of war by manœuvring. Only thus is it explicable that long lasting wars, as for example the Spanish war of succession at the commencement of the 18th century, present comparatively so few battles. This war lasted more years than that of 1870-71 did months. There took part in it as many again of the powers of Europe, and yet in 1870-71 far more battles were fought.

Frederick the Great certainly broke with this strategy of taking up positions and covering countries. He sought out the enemy's forces, fought them, and then only assured himself of the possession of territory. But when the superior numbers of his enemies had exhausted his resources in money and men, he often had in the second half of the seven years war to avoid battles and have recourse to the strategy of positions. He did not however do this, because he thought this strategy the more effective, but because the enemy was thereby blinded and likewise avoided decisive engagements. Thus alone could the great king, with tenfold force against him, escape ruin.

He had therefore apparently practically set his approval to this kind of strategy. The Prussian leaders, who had been proved in war towards the end of the 18th century, had been educated in this strategy, had won victories with it, had gained renown with it, and defended the Fatherland against the unruly hordes of the Republic. No wonder if in 1806 they still laid their plans by the same rules.

Thus all plans of operations which were suggestd in the year 1806 in high quarters on the Prussian side, breathe the spirit of this same strategy. Generally the objective of the operations is a geographical point and not the enemy's army. The plan which Colonel von Massenbach proposed is most characteristic. He wished to advance with the Silesian army through Saxony by Hof up to the Danube, and then carrying all before him to return victorious to Silesia through Bohemia. Such a plan would, according to the principles of strategy prevailing to-day be considered the proposal of a madman. At that time its author was one of the most scientific of the superior officers of Prussia. Another plan begins, to be sure, with the enemy and the information they had of him. It goes on to demand the advance of one army by Gotha to Fulda, of another upon Hof. An intermediary Corps was to advance from Erfurt towards the Thüringer Wald, and a reserve army to be stationed at Naumburg. Thus were the Prussian forces to be divided into four and be separated from one one another by 19 to 20 miles. The explanation that the two armies at Fulda and Hof would form two formidable bastions, of which the Thuringer Wald and Rhöngebirge would be the curtain, proves how they liked to move at that time in learned phrases, in which not even the very men who employed them, could have seen anything practicable. Such phrases however made a deep impression on the hearers, just because they did not understand them, for they were afraid to appear ignorant by confessing it. Yet just this very plan was deemed by the writers of the period to provide the only remedy.

Seeing the views then prevalent about strategy one may well wonder that at last a plan of operations was adopted which in its outlines and aims may be termed not injudicious. With the assumption that the enemy was distributed about in Bavaria and as far as up as Frankfurt, this plan was, to push forward the army with united forces from the neighbourhood of Erfurt over the Thüringer Wald, break in upon the enemy's army and beat him in detail.

But this plan was not carried out. A deliberation upon all possible pros and cons brought it to this, that too great forces, for example Rüchel, were applied to minor aims and diverted from the main object, and that finally allowance was made for other suggestions: for example, the Silesian-Saxon army was permitted to take the road to Chemnitz (which arrangement afterwards underwent alteration.) The army then was all split up and stood from the 5th to the 8th October with few changes, thus :—

Rüchel at Eisenach, outposts near Hesse and Meiningen ;
The main army round Erfurt, outposts up to Hildburghausen ;
Hohenlohe, round Jena and Roda, advanced guard towards Saalfeld ;
Tanentzien at Hof, Gefell and Schleiz.

And so at a moment when the enemy had united his forces into one single mass, which moved foward with a front of 8 miles, the Prussians had extended themselves laterally more than 18 miles. Consequently the enemy rather was in a condition to break in upon the Prussian army than *vice versâ*.

Least of all did the execution of the plan correspond with its fundamental idea, for time was lost instead of being put to use. The execution was delayed in such a way that the advanced guard could only reach Meiningen and the neighbourhood on the 11th October. It could no longer be termed a strategic surprise. (Want of harmony between Policy and Strategy.)

What gave rise to this loss of time, when an important start had been gained through the political initiative? The answer to this question, which history imparts, contains one of the most important lessons in Strategy.

Amongst men of weight in Prussia the King belonged to the few who were not entangled in the prevailing scientific theories of Strategy. Wherever his views disclose themselves, they are based on sound sense. This we know from the utterances of his, which have been transmitted to us, and from his letters, amongst others, to Rüchel. He wished to fall upon the enemy with united forces, to surprise and fight him. He recognized in good time that it was too late and when it was too late for the strategic surprise; but he was still young in comparison with his distinguished generals, some of whom were to a certain extent his tutors. He seems to have had a high opinion of their military knowledge and of their proved experience and not to have trusted himself to thwart them with his authority. In order therefore to do what was best, he frequently called the generals together and listened to the suggestions of all. These councils had begun in Berlin, they often lasted for days; as long as they lasted, nothing was done, for no decision had yet been arrived at.

Still more harmful than this loss of time was the fact that in the effort to discover the best, plans were constantly being altered, every time that the one or the other general produced fresh reasons in support of his opinion. Hence arose orders and counter-orders, marches and countermarches and thereby double loss of time.

The summons to council of generals of an army has yet further fatal consequences. It is prejudicial to the authority of the highest in command, if his inferiors may venture to express their own views, especially if they now and then succeed in carrying them. Moreover a subordinate general can easily be misled into the idea that his proposal may yet be followed. Consequently he does not carry out the last orders he received with his whole heart and acts longer than is beneficial on the feeling that he will eventually be able to operate in accordance with his own plan. Hence proceed fatal uncertainties and half measures. We shall learn to recognize the catastrophe of Saalfeld as the consequence of uncertainties that had thus arisen.

The Best is the enemy of the Good. That is an old proverb, which is never more true than in Strategy. He who holds a council of war, is half beaten. It is better to take a less good resolution and consistently carry it out than to take counsel of subordinates and thereby bring about loss of time and uncertainty.

Where history relates important successes in war, the commanding generals there never gathered their subordinates together to deliberate. They did perhaps accept one or the other's opinion, but they themselves gave out the final decision and, at the time that they made up their minds, their subordinates were far away. Frederick the Great collected his generals together only for the purpose of issuing orders. Napoleon never held a council of war but despatched only very clear categorical instructions and commands. He even preferred to write detailed letters, in which he clearly laid down his projects, if it was necessary that his generals should be made acquainted with them, rather than to summon them to deliberate or receive verbal instructions. The German war administration of 1870-1 rightly roused the admiration of the world. Did ever a meeting of the subordinate generals in council of war take place then? Never! The Grand Head Quarters issued the "directives"* to the army according to directions received from His Majesty. The Army Head Quarters issued orders, dispositions or instructions to the Army Corps. Commanding Generals were accustomed not to see their superiors, nor these H. M. the King for weeks together. They never, unless it was necessary for their special guidance, heard the motives for the decisions passed by higher authorities, and so they did not find themselves in a position to waste their time with suggestions for the general line of operations and could devote themselves entirely to their duties at home in their own commands.

For the leader of troops has in time of war quite enough to do with what belongs to his own office. If he be drawn into councils upon general operations, he is taken away from the troops in his command and is obstructed in his superintendence of them. The period from the 8th to the 14th October 1806 in the Prussian army gives us many an example of the harmful results of taking commanders away from their men. We learn therefore from the proceedings of the Prussians in 1806 that it is for more important to have some clear and definite purpose before us than to lose time over the choice of the best course and to alter plans once formed. Against these measures of the Prussian army, which after much deliberation were judged to correspond with scientific principles, Napoleon set a simple straight march forward. In that "battalion square of 200,000 men" which covered 8 miles in area, he moved off his army direct upon the capital. His strategy was at the commencement perfectly simple to downright clumsiness. But he lost no time in useless action, at any rate as far as deliberations go.

After the army had had two days of rest, Napoleon pushed forward with this mighty engine of war in firm conviction of being able therewith to rend the finest web of strategy his opponent could weave. From the measures he took Clausewitz extracted that great truth which he propounded in the words "In war every thing is simple, but to be simple is the difficulty."

I have already compared the opening of the campaign of 1806 on the French side to the advance of the I. and II. German Armies through the Palatinate in the year 1870. The openings of the two campaigns are also similar in that the leaders on both occasons made for the present in anticipation no plans beyond the strategic advance, better named, the concentration of the army. What was specially to happen afterwards remained to be seen. There have been men who asserted, that at the beginning of the campaign of 1870 Moltke had already planned the capitulation of Sedan. That is absolutely impossible, just as impossible as that Napoleon in 1805 at the outbreak of the war could have thought

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*"Directiven" is the German Official name for "communications from a higher place to a lower one in which not so much definite orders for immediate observance are issued as leading features * * * they serve then as a line to be followed in the decisions that are independently taken." (The Nation in Arms, by von Goltz.)—Translator.

of the battle of Austerlitz or in 1806 of Prenzlau. The first plan of strategy can only be the strategic advance of the army. This advance being completed, an essential difference steps in between the measures of the French in 1806 and those of the Germans in 1870. Napoleon frequently said: "On s'engage et puis on voit." This truth which refers to most situations in Tactics he seems to have applied to Strategy, for he marched straight upon the enemy and only after the first engagements got clear information about him.

The German leaders in 1870 went about it in the opposite way. They first observed the enemy with their advanced cavalry, they procured themselves strategical information, and only then engaged. At all events they proceeded more systematically, more correctly and more prudently. Is that a reproach for Napoleon? I think not. If an observant pupil builds upon the foundation which his tutor has laid for him, he must, supposing him equally ingenious, now and then surpass him.

When the Prussian leaders in 1806 awoke to the fact that the time for a strategic surprise was past, they after several days of consultation among the generals and their staff officers came to the conclusion in Erfurt on the 7th October, not to cross the Thüringer Wald on the offensive but to wait behind it (to the north) with their armies united in the neighbourhood of Erfurt for the development of the enemy's movements in order to fall upon him wherever he might emerge, like a tiger lurking for his prey. This plan too was strategically not so bad. Whether the enemy threatened to turn the right or the left flank, they would always be in a position to fall on his flank with united forces, and a direct advance upon the front of the Prussian army through the defiles of the Thüringer Wald afforded the enemy the least chances of success. The King's letter to Rüchel of the 7th October gives expression to this sound conception.

How this idea also was not fully carried out but underwent alterations by pursuing minor objects and following dissentient counsels, we shall see when we examine the strategical operations from the 8th to the 13th October.

To be continued.

THE COSSACK OF THE PRESENT DAY.

Translated from the Russian by LIEUT. S. H. GODFREY, BOMBAY STAFF CORPS.

Russia possesses one kind of auxiliary force which none of the other European powers have. The historical 'Kazachestvo' settled in different localities of the vast Russian Empire consists at present time of 5,000,000 people; and in Europe alone including the Caucasus and the Orenburg district the general Cossack* population reaches the figure of 4,500,000 and furnishes for service, in peace time, 40 cavalry regiments and 20 horse artillery batteries. But in time of war this force could be easily nearly doubled.

In spite of these manifest advantages, there was a time, now happily past, when a false conviction was gaining ground, that the Cossacks had outlived their age, that they constituted an imperium in imperio, and that it would be better to gradually commingle them with the general population of the Empire. Ignorance of the Imperial needs and the advantages which the Government may some day derive from this curious military stratum of society, could alone allow any one to share this opinion. Putting aside the respectable figure of regiments and corps which could be formed at the first call of war, we must pay careful attention to the position of those vast and distant countries of our Asiatic dominions whose boundaries extend, on the one side to the Pacific Ocean and on the other——to the skirts of the Himalayas. Who can better or at less expense guard the confines of this country, than the settler Cossack who is ever ready for armed resistance and is at the same time a useful pioneer of colonisation? The services rendered by him in the Causacus, Siberia, and Central Asia cannot be too highly valued, and when considering the position of our Eastern dominions, we must come to the conclusion that not only has the time for their disbandment not come, but that Imperial foresight demands that the Cossack forces should receive support and be increased both in Siberia and Central Asia.

Having thus glanced rapidly at the advantage of and necessity for their preservation we will pass on to a description of the character, peculiarities and qualifications of this particular branch of the service.

Although they are a sufficiently important auxiliary arm yet the Cossacks are very different from the regular army. Joining with their own horses, uniform, and equipment, each Cossack is at the same time a member of the agrarian community of his own village where he has his home and his household. Having served the time laid down on foreign service (Vnyeshnaya Sloozhba) he returns to the domestic hearth on the understanding that he is to be ready for service when his turn comes round again. These few words will suffice to shew how great a difference there is between him and the regular cavalry soldier and how, therefore, the value of the services of the one and the other must be judged from different standpoints.

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* This word should be written '**kázák**' to give the correct pronunciation and orthography of the Russian.

In view of the exceptional conditions of their interior economy and methods of equipment, in the administration of the Don army* which serves as a model for all the other Cossack forces, every thing which may tend to ensure their welfare and that of their households has been foreseen. A special 'privilege' right has been granted, by which, even in time of war, any Cossack who may be overtaken by misfortune, such, for example, as the death of his wife, a fire at home &c., can be sent back to his country and replaced by another from the reserve held ready to replace losses in the field. Only when such care is taken for him can the Cossack go on service without detriment to himself and on entering on a campaign equip himself at his own expense without ruin to his household.

We have thought it necessary to touch these conditions in view of the changes which took place a few years ago in the regulations concerning their 'out' service. Formerly in time of peace they were employed partly on guard on the W. frontiers and partly on duty in the interior. Since 1879 with the new organisation of the regular cavalry, one Cossack regiment has been added to each cavalry division and so 14 regiments have been brought into the 'regular' branch and subordinated to 14 different cavalry commanders, and, counting the brigadiers, many more than this. There have been formed, besides, three separate Cossack divisions, of which one is of the Don, and two of the Caucasus, and besides this there is a guard brigade. We have not touched here the Cossacks of E. or W. Siberia, Turkistan, or Trans-Caspia.

This then is the general state of the Cossack army in peace time in the European portion of the Empire and countries beyond those limits. On reviewing this organisation it is impossible not to express approval of the addition of entire Cossack units to the separate divisions and brigades. The measure is good and is one which suits the peculiar qualities of Cossacks. But an organisation which brings them under the head of regular cavalry is open to grave criticism. To try and introduce steady drill and subordinate them to leaders unacquainted with their customs and peculiarities would be to eradicate those inborn qualities and capabalities which distinguish this branch of the army- The Cossack, an inhabitant of the steppe, has been given by nature a peculiarly keen power of vision, and a horse with whom he has grown up from childhood and on service both he and his horse are untiring, As a single horseman, he knows no obstacles during the operations of a campaign, but being without any training he cannot conform to the hard and fast demands of regular drill and that is the reason why a special 'Drill Regulations', founded on experience and fully answering to the necessities of their conditions of service, has been issued for them. To go further than this in their drill instruction would be a great mistake and would lead not to their improvement but rather to the destruction of this useful arm.

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* The Don Cossacks enjoy the reputation of being the 'crack' Cossack corps. Their manœuvres tho' not ' exact" are rapidly executed. Translator.

In answering, on the other hand, the question as to what success one may expect in time of war from the addition of Cossack regiments to cavalry divisions, one must admit that the advantages may only be negative. Fourth regiments are formed in the cavalry divisions, but, in the meantime, they do not stand on the same level with dragoons and will always be their weakest point. In a real cavalry engagement, demanding unity of attack and support by regiments of equal calibre, this mixed composition can hardly be advantageous. If they tell us that the Cossack's chief duty in war time consists in carrying out outpost and reconnoitring work, which is perfectly true, then it cannot be desirable to have Cossacks and regular cavalry in the same corps. Outpost duty is one of the most difficult and trying for both men and horses and there is no doubt that, if the cavalry is kept at its present strength, on the commencement of military operations, the whole weight of this duty will bear on the Cossacks alone. We have seen, unfortunately, how in the last contemporary wars, the continued and uncalculating use of them by divisional commanders for the protection of advanced posts and patrols reduced the Cossack regiments in a very short time to a condition of complete disorganisation. Scattered in different detachments over the theatre of war, the Cossacks were usually led into battle in extremely weak numbers and consequently, in the eyes of the army, they not only did not fulfil the hopes entertained concerning them but lost their former merited renown.

But with a different organisation and method of utilising them we may expect undoubtedly brilliant success. The principal evil is their excessive disintegration in time of war and division into small parties for the purpose of reconnoitring and patrols. This in part is of course inseparable from those duties, but, besides this, they are detached for orderly duty to the head-quarter officers, to all on the staff and to every one holding a high command. The expenditure of men in this employ is so great that often, of the regiment under his command, the colonel and his officers alone remain with the standards. If we add to this the want of care displayed by the divisional commanders for these men on their heavy outpost duty* can one wonder that in the late wars they did not accomplish any great feats?

They are mostly accustomed, in our army, to look upon them as an *auxiliary* force which they may sacrifice for even the tranquillity and repose of the regular forces, while with the present numerical strength of the Cossack regiments and their indisputable qualities, they *could* under a different regime constitute a *military* one.

Let us take an approximate estimate of the number of regiments which the Don, Caucasus, Ural and Orenburg forces could furnish in case of war. Without the least exaggeration they could add 60 regiments to the army. Putting aside, or better, sacrificing one-half of these for service with the different army corps, divisional and orderly duties, there would yet remain 30 regiments which could be kept for separate action and enterprise. Formed into divisions, (the commencement was made in the last Turkish war) it would be desirable to keep them intact under all circumstances, and having added a certain quantity of Cossack horse-artillery batteries to them, to utilise them at the discretion of the Commander-in-Chief for bold, sudden, and separate assaults. Entrusted to brave and resolute Cossack leaders they would undoubtedly do great service. Only when used thus will they repeat their historical exploits, such for instance as their capture, under Count Orloff-Denizoff, of 40 of the enemies guns at the battle of Taruku, their attack on Berlin, and their capture of Cassel the capital of Westphalia. Only then will the former fame and merits of the Cossacks rise from their ashes, merits recognised by our former allies of the Napoleonic times and fame acknowledged at that time by even our enemies themselves.

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* A Cossack Colonel, during the late Russo-Turkish war, was ordered in to head-quarters from the Balkans, a march of 50 versts. On reporting his arrival he was ordered to take away his 'useless Cossacks.' He obeyed, and on being resummoned refused to come. The incident is illustrative of the opinions of a certain section of Russian Officers concerning the value of the Cossack force. Translator.

In conclusion we would add a few words concerning the importance of the preservation of the 'ataman' (leader). Selected usually from among the veteran generals of their military caste, he is responsible for 1. The constant supervision of current losses on service in the batteries and regiments, 2. Dispositions for replacing them by men sent out from the special bodies 'in waiting'. 3. The freeing of Cossacks under certain circumstances from service and returning them to their homes. 4. The inspection of the regiments. But these are not his only spheres of duty and influence in the army. As head of the whole 'Kazachestvo' or Cossack body he must, according to the importance of it take personal part in any action and encourage his men. Such was the way with the 'atamans' Denizoff, Platoff, Vdasoff and others, and their names are still famous in Cossack legends.* The office has existed from old times, the duty is a highly honoured one, and as a link binding the Cossacks to their legendary times, its preservation as a reward for service should be considered absolutely unindispensable.

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* In the days when the Cossacks were semi-indeпendant of Russian rule, 'valour' was the first consideration in the selection of the 'ataman.' Translator.

Correspondence.

THE SECRETARY UNITED SERVICE JOURNAL.

"FIELD MANŒUVRES."

Dear Sir,

I should be glad if the opinion of officers could be invited on the following points connected with the practice of field manœuvres, all of which have I think an important bearing on their practical execution. Should no officer who may peruse this letter have had any experience of the actual working of the systems herein described, I would hope that some may be induced to give them a trial during the coming drill season, and favor us afterwards through the U. S. Journal with the benefit of their experiences.

1st.—A system for representing the object of artillery fire at field manœuvres by *sound*.

The artillery in the field must have often desired some method of clearly signifying to the troops under their fire, what they are firing at, in a manner somewhat less demonstrative than real shell and more decided than the discs at present in use which few look at and fewer still regard.

It occurred to me that artillery possess in themselves the very thing desired, if only properly utilized. The sound of a blank cartridge is a signal that no one can ignore, unless to our great Admiral's one blind eye he adds two deaf ears.

How then to utilize it? My plan is that each arm of the service under artillery fire, whether cavalry, artillery, or infantry, should be represented by a fixed number of shots from each battery or half battery* firing on it.

Of course these numbers might have been fixed arbitrarily, but with a view to aiding the memory I chose the following series, which follow both the order of seniority of the three arms, and also the usual order of their employment on the battle field. Thus I propose that single guns fired at a distinct interval, say of one minute, should be used when firing on cavalry, two guns in rapid succession when firing on artillery and three guns in similarly rapid succession when firing on infantry.

I may add that I have seen the system tested on more than one field day, and though perhaps some allowance must be made for parental partiality I honestly consider it to have been successful.

Artillerymen may perhaps urge that it is opposed to the manner of firing on service, and I go with them thoroughly in wishing to assimilate peace manœuvres as much as possible to service conditions, but we know that it is impossible to do this thoroughly with any arm, and the departure from the reality in this case is I think atoned for by the advantages sought, and I venture to hope, gained.

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* It will be seen that the system is not applicable to a smaller unit than a half battery.

One class of officers will I feel sure recognize the benefits derivable from the system. I refer to those liable to be detailed as Umpires. Who of those appointed to this somewhat invidious duty has not been occasionally non-plussed to give a decision as to the number of slain creditable to a battery which claims to be dealing death and destruction at the same moment to a squadron of cavalry charging in the foreground, to a battery in the middle distance, and to a battalion in the back-ground; or, on the other hand, what umpire has not felt some sympathy for the blank astonishment on the face of an infantry commander when duty compels him to point out that a battery of artillery claims to have been firing on him for the last ten minutes and to have demolished his battalion.

The sound of the guns too acts as an useful guide to a chief umpire as to the progress of the fight in distant parts of the field, and enables him to repair to any point that he may consider of especial importance.

It is true that as the action progresses and the fire from several batteries is directed simultaneously on different objects, it becomes more difficult to distinguish by sound only the particular object aimed at by each battery, but the puff of smoke from the guns will be then plainly visible, and sight will assist sound.

I would commend the system for impartial trial during the coming drill season, and would hope that officers who may have the opportunity of testing its practical utility will kindly report their experiences in the pages of the U. S. Journal.

The second point that I should be glad to submit for opinion is the best method of representing casualties in the field.

This is I think very important and it should be practised on every occasion that troops, however few in number, are exercised in the attack formation either with or without blank ammunition.

When blank ammunition is not used the usual plan adopted is for non-commissioned officers of sections to direct a certain number of men to fall out as casualties as the advance progresses, but this is objectionable since section commanders have, or ought to have, enough to do with the charge of their sections.

With blank ammunition the plan of serving out a less number of rounds to a certain number of men who are directed to fall out as casualties when their ammunition is exhausted, has usually been adopted. A difficulty here occurs as to the supply of ammunition from the reserve to the fighting line, a most necessary practice, for if all continued to receive ammunition the above plan would of course be frustrated. This difficulty may be overcome by directing those men who received short ammunition not to take any of the ammunition sent up from the reserve but even here a fresh objection appears for it becomes impossible to practise the collection of ammunition from the dead and wounded, also a very useful practice for peace time.

To remedy all these objections I would propose that small tin labels with successive numbers painted legibly on them, be served out on parade to such numbers of men in each company as it is desired should become casualties, and that the men should be instructed that after firing the number of rounds marked on the label they hold they should fall out as casualties. The labels might be attached by a piece of twine to the trigger-guard of the rifle so as to be continually "en evidence."

Lastly, I would recommend for practice during field manœuvres, the habit of staff officers or orderlies invariably repeating an order, however simple, to the giver, before riding off to deliver it. Nothing but the strictest systematic enforcement of this rule in peace time can ensure its being carried out amidst the din and excitement of battle, and history teems with instances of disaster directly due to the misconception of verbal orders.

Yours faithfully,
H. BENGOUGH, *Br. Genl.*
Commanding Nagpore Force.

KAMPTEE, 18*th June* 1888.

Since sending the Journal the description of my plan of representing casualties, I have seen Sir Archibold Alison's admirable order on the Attack Formation, in which it is laid down that casualties should be represented by the flank men of sections falling out on the order "casualties;" being given.

This plan seems effective and simple, but is I think somewhat too formal.

The system that I have suggested represents more nearly the indiscriminate action of an enemy's bullets, and enables the closing in of sections to be practised which the Aldershot plan does not admit of.

H. B.

Journal of the United Service Institution of India.

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CHINA AND THE CHINESE ARMY.

A LECTURE DELIVERED BY

Lieut. F. E. Younghusband, F. R. G. S., *King's Dragoon Guards.*

Major-General E. F. Chapman, C. B., A. D. C.,
Quarter Master Genl. in India, in the Chair.

China is a country which, on account of its long and remarkable history and the peculiarities and extraordinary intelligence of its people, as well as for many other reasons, is well worth studying, and it ought to be especially interesting to Englishmen in general on account of our large trade with it, and to us in India in particular, because our frontiers are conterminous for many hundreds of miles, from Yarkund in the north to Bhamo and the Shan States in the south, and we are daily being brought into closer connection with her. Most Englishmen, however, have a very hazy idea as to what sort of people these neighbours of ours really are.

Those who have read accounts of the country know that only a few centuries ago the Chinese were far ahead of us in civilisation, and the most powerful people in the world. Marco Polo, for instance, says :—" All men know for a certain truth that he (the Emperor of China) is the most potent man as regards forces and lands and treasure that existeth in the world, or ever hath existed from the time of our first father Adam until the present day." In the last few centuries we have gone ahead while they have remained stationary, but they are even now the most populous nation on the face of the earth, and in many respects the most remarkable. The Chinese are—luckily for the rest of the world—essentially a peaceful people, a nation of agriculturists possessing little or no warlike instinct or military ardour. Love of sport and manly outdoor games is no part of their national character, and the military profession is universally looked down upon and despised by them ; the only way to distinction and honour being by passing literary examinations in ancient classics, whereby an appointment as a civil magistrate may be gained. Yet it must not be supposed from this that the Chinese are a weak and submissive race. On the contrary, they can shew pluck enough when occasion requires it, and they are an extremely proud—or, as some people call it, conceited—nation, considering themselves as far superior to us as we think ourselves superior to them; and say that, although we outer barbarians (the English, French, Russians and other European nations) are rather good at fighting, yet it is only because within the last few years (for the last century is to the Chinese as the last decade is to us) some slightly better guns to what they happen to possess at the present time themselves have been invented by our blacksmiths (as they call the engineers and mechanics). A Chinese writer, indeed, recently said of the French: "The strength of France lies in her navy: fighting on land is not her strong point. France's moveable army consists of 500,000 men, and it is not likely that they would all be transported to Tonquin. China by a mere wave could bring forth her millions. In battle the French depend upon their guns, but these can only be used upon level ground; what good they be in uneven and hilly country? A French soldier is armed with a rifle which is useful at long distances; at close quarters he would be no match for the brisk activity ofa Chinese warrior." This will give you some ideaof the kind of opinion a Chinaman holds regarding European Powers. But though these "brisk warriors," of whom the writer quoted above seems so proud, are scarcely perhaps so good as he seems to think them, they nevertheless have some excellent qualities; and an officer who served with Gordon's army says of the Chinese soldiers that "the old notion is pretty well got rid of that they are a cowardly people when properly led and paid; while the regularity and order of their habits, which dispose them to peace in ordinary times, gives place to a daring bordering upon recklessness in time of war." Their intelligence and capacity for remembering facts makes them well fitted for use in modern warfare, as does also the coolness and calmness of their disposition. Physically they are not so strong as Europeans, but considerably more so than other Asiatic races. Finally, they are excellent sappers, it being second nature with them to throw up a mud wall of some sort to get behind, and they are so ready and apt at learning drill that a German officer told me he could teach a Chinaman in one month as much as would take six months for a German recruit to learn. They have their bad points certainly: they are merely given to stealing and to bullying the inhabitants of the country they pass through, and their discipline, except under a leader whom they respect, is not what it ought to be. Still, on the whole, the material for recruiting the Chinese army is, as has been repeatedly acknowledged before, excellent. But the officers are not good, for the military profession being thought so disparagingly of, it is impossible, as a rule, to get good men into the army. Yet China has produced some generals who have shown the most devoted patriotism, and strategical ability of a very high order in the conception and conduct of campaigns. Such a man was General Tso-Tsung-Tang, who with undaunted perseverance collected an army, set up an arsenal with European aid to supply his men with arms ; and then, after first crushing the Mahomedan rebellion, marched his forces from one end of Eastern Turkistan to the other, reconquering the whole country. Fortune no doubt favoured him in some way, and he might not have been so successful had Yakoob Bey lived : but the indomitable energy of the man and his determined resolution showed that he possessed some of the highest qualities of a general. Such men are of course exceptions, but they do exist in China, and it would be unjust not to take them into consideration when denouncing the generality of Chinese officers so strongly. But the Chinese Empire is not entirely peopled by Chinese, but also by nations of a widely different character inhabiting the great outlying dependencies of Manchuria, Mongolia, Eastern Turkistan and Tibet. I have travelled through the entire length of the first three of these, and a description and comparison of them and the people who inhabit them will be of interest.

The first of these, Manchuria, is really a magnificent country, and perhaps surpassed by few countries in the world for the richness of its soil and the abundance of its natural resources. The plain country of Manchuria is covered with the richest cultivation, and dotted over with flourishing villages and thriving market towns ; and the hills are covered with magnificent forests of real old English oaks and elms, beneath the shade of which we saw whole banks covered with sweet-smelling lilies of the valley, columbines, irises, tiger lilies and other descriptions of choice flowers. The mineral resources are at present undeveloped, but we found gold, silver, iron and coal within twenty miles of each other, and gold is found in nearly every part of the country. Rivers are numerous and large, and afford ready means of floating down the timber and other products of the mountain to the sea ; while a fine navigable river—the Sangari—runs from the heart of the country into the Amu river, and would afford a ready means of opening up the country did the Chinese permit the Russians to use it, which they do not. Considering the extreme richness of the country and that it is the birthplace of the reigning dynasty, it is natural that the Chinese Government should pay considerable attention to its protection. The Kirin arsenal is of considerable interest, because it was set up and is entirely managed by Chinamen educated under Europeans at the Tiensin and Shanghai arsenals. At the opposite extremity of the Chinese Empire is a country which is better known to Europeans through the writings of Shaw, Hayward and others, and the members of Sir Douglas Forsyth's Mission, one of whom, General Chapman, has done me the honour to preside at this lecture this evening. Moreover, within the last year or two it has been traversed from end to end by Mr. Carey, whose name, Sir Henry Rawlinson says, will ever be classed in the first rank of explorers, and who was accompanied by the Yarkund trader Mr. Dalgleish, whose recent murder on the Karakoram Pass has caused so much regret amongst all Englishmen who can appreciate true pluck and enterprise. Eastern Turkistan is a country widely different from Manchuria in every respect. In place of the richly cultivated plains and forest-clad hill-sides it consists of really nothing but a huge desert, with villages and towns situated in the oases formed by the succession of streams which flow down from the Tian-Shan mountains. And whereas in Manchuria the rainfall is excessive and rivers both numerous and large, in Turkistan rain is hardly known, and one can travel hundreds of miles without crossing anything but the smallest specimen of a stream. And, again, while in Manchuria there are thousands of acres of the richest land only awaiting the advent of colonists, in Tukistan every square yard of soil which can by any possibility be made to bear a crop is cultivated. The country is almost denuded of troops, and those that are there can scarcely be termed anything but police. They are quite sufficient, however, to keep the country in order, for the Turks are as quiet and submissive people as any in the world. Between Eastern Turkistan and Manchuria is Mongolia, a country which again differs in many respects from either of these. It is an immense country, larger than India, but contains a population of only three or four millions, for it is a desert, almost rainless region, and inhabited by a nomadic and pastoral people, who do not cultivate the land, but spend their lives in tending the flocks and herds which roam over the boundless plains. This was the home of those Tartar hordes who, under Chingiz Khan and his successor, first conquered nearly the whole of Asia, including China and India (forming in the latter country the Moghul or Mongol Empire), and then overran Eastern Europe, subduing Russia and other States, occupying Moscow and the principal cities, and dealing destruction everywhere. But a vast change has come over their character since those times, and these sons of the desert, formerly so fierce and terrible, are now a simple pastoral people, lazy and indolent, and without a spark of spirit left in them. And whereas formerly they were a constant source of danger to the Chinese now scarcely a thought need be given them. The principal reason of this is that the Government have for centuries studiously devoted their energies to breaking the spirit of the Mongol, and have purposely encouraged the men to become Lamas; and now it is said that as much as sixty per cent. of the whole male population are Lamas, who by their religion are neither allowed to marry nor to fight.

The late Captain Gill has given a very detailed account of the Chinese army, so I need only refer very briefly to its organisation, and then pass on to study the result of the two campaigns in which it has been engaged since that account was written. It is well known that China is a subject country like India, and that its conquerors the Manchus bear much the same relation to the Chinese as we do to the natives of India. Consequently in China, as in India, there are two distinct armies, the Manchu army garrisoning Pekin and all the principal cities of the Empire, and the native army (called the Green Standard Army) composed entirely of Chinese and distributed over the country. In addition there are special troops raised for the particular defence of special points, such as the approaches to Pekin, Manchuria and Eastern Turkistan; and for the defence of Mongolia there is a small force of Mongol militia. It is impossible to give any exact statistics of the strength of this force, but probably the whole effective force numbers about 600,000. Of these, however, only some 30,000 "foreign devils" under Li Hung Chang, stationed at Tientsin for the defence of the approaches to Pekin, can in any way be called efficient according to the European standard.

During the last twelve years China has been engaged in two great wars: the first for the re-conquest of Eastern Turkistan or Kashgari, and the second against the French; and a study of these campaigns will be interesting as showing the practical working of the Chinese military system. The first thing noticeable is that the Chinese had to raise troops specially for the conduct of these campaigns; the standing army, in fact, was found to exist for the most part on paper only, and those that were actually present considered it to be their duty only to defend the town in which they were quartered. "We have never fought before," they said, "so how shall we know how to fight now? If the enemy comes to attack our town we will defend it to the last: but we cannot go away to fight him." Consequently to raise troops to fight the French in Tonquin the Chinese had to send to the farms and villages and offer men who would enlist rather higher wages than they would get in ordinary civil life. For the conduct of the war in Eastern Turkistan General Tso had even greater difficulty in raising men, and it was only by kidnapping or by making promises of high rewards and promotion that he eventually raised a sufficient force. The suffering which this army had to endure was such as few but Chinamen could have stood: for the theatre of war was mostly a desert country, water was always scarce and food often unobtainable. European and other eye-witnesses of some of the fighting say that neither side was particularly conspicuous for their bravery and daring; but although this was certainly the case, and although the subsequent success of the Chinese was due more to fortune favouring them in the death of Yakoob Beg and the dissension in his kingdom which followed, and to the superiority of their arms, than to the valour of the soldiers, yet this campaign will always be remarkable as an example of the pertinacious way in which China will follow out her object. She had lost a province, and her prestige had suffered in consequence, so she resolutely determined that, come what might, she must recover that province and her lost prestige, and re-assert her superiority in her Central Asian possessions; and she did it. Further, having thoroughly re-established herself in Eastern Turkistan she turned rouud upon Russia and said: "Now you must give back that province of Kuldja which you took from us till we could take care of it ourselves as you said." And so persistent were they in their demands that the Russians were obliged reluctantly to restore the province. Some say that the game was scarcely worth the candle, and that a vast country, for the most part desert, like Eastern Turkistan, and separated from China proper by such enormous distances, was likely to be rather a source of weakness than of strength to the Chinese Empire. But what the rulers looked to more than the gain of territory was the gain of prestige, and there is no doubt that this has been added to immensely by the re-conquest of Turkistan. For in Central Asia I found that the inhabitants, and even Afghan and Indian merchants, who had travelled through both English and Russian territory, and some of whom had even been to Constantinople and Moscow, all seemed to think that the Chinese were far stronger than English, Russian, French or any other

European Power. We are rather accustomed to regard the Chinaman as the "Heathen Chinee," and are apt not to quite realise the importance the Emperor of China bears in the eyes of Asiatics; and I believe it is a fact, that even in such states as Nepal and Kashmir, the Chinese are not uncommonly considered to be equal to, if not superior to the British. And it is certainly true that nowhere in Central Asia is it believed that we ever took Pekin, for they say: "How could you have? For you must have either burnt it to the ground, or retained possession of it, and you did neither." We prefer therefore to believe what the Chinese tell them, which is that we reached Pekin, but were driven back in our ships again with immense loss.

In the last war with France the Chinese were successful in the end though not on account of the efficiency of the Army or any extraordinary amount of valour displayed by it, but because the French conducted the war in a half-hearted desultory way, and their troops had to fight in a country most deadly in its effects on the European constitution, while such victories as the Chinese won were gained through the sheer weight of overpowering numerical superiority. In criticising the conduct of the Chinese troops in the Tonquin war, a writer in the *Journal des Sciences Militaires* says that they were well armed but that their leaders were bad. That the Chinese only passed to the offensive when in greatly superior numbers, and that in the offensive they are not formidable, though behind cover they defend themselves with great obstinacy. Their artillery practice was bad, but the small arm fire from behind cover, good. Chinese soldiery, even those inured to fire get into confusion, and in the open they will never stand. Finally the writer says "accord between Commanders was wholly wanting."

An Englishman serving under the Chinese in the operations in Formosa told me that they seldom practised manœuvring of any sort before an enemy. That their usual way was after taking up a position to fortify it and await an attack; that they would stay behind these entrenchments for ever, as they thought there was less risk of being shot by staying where they were than by running away. This rather strengthens the opinion of a Russian Military observer, who considered that the French made a mistake in devoting so much time as they did to preliminary Artillery fire, and that what they ought to have done was to have rushed the position. The French war and the continued pressure of Europeans has had considerable effect on China, in making her see the necessity of conforming more to the spirit of the times—reforming her military system, constructing railways and telegraphs and adopting other modern inventions. Especially during, and since the French war, she has shown an unusual amount of energy in military preparations, and her court line is now bristling with Krupp guns peeping out from behind fortifications of modern design. Arsenals and dockyards too, have been set up, and her troops are being gradually armed with modern rifles. She has too, finally consented to the construction of railways. In 1887 I had the pleasure of riding over the 30 miles of railway which existed near Tientsin, and it will probably soon now reach the capital. There is no doubt then, than the Chinese are "going ahead," but it is very gradually, for they are intensely conservative, naturally so ; for they look back upon an honourable history of nearly two thousand years. For centuries her rulers have successfully governed China Proper and her dependencies. The people are, I believe, the lightest taxed in the world ; they are peaceful and contented ; the well-to-do condition of the poor classes is especially noticeable. And Mr. Carey, as well as myself, has noticed how lenient, and on the whole, just, the rules of China is in a conquered country like Eastern Turkestan. The Chinese, therefore, have some reason to be proud of their part, and seeing how well they have got on so far, they naturally hesitate to plunge rashly into the adoption of all these new fangled modern ideas. They are stately and deliberate, and will not be hurried. But they are going steadily to work. They were stronger at the commencement of the French war than they were in 1860, and they are stronger now than when they fought the French.

Such is a general sketch of the present condition of the great Chinese Empire. Europeans are beginning to understand more of the exclusive Chinese, and they in their turn are gradually appreciating in a greater degree the modes of thought of Europeans, and the more the two understand each other the more advantageous it will be for both sides. Englishmen especially ought, considering the commercial and political ties which bind the two countries together, to have special regard for the welfare of China, and wish her every success in the course of improvement she is now beginning to adopt. And it is certainly the wish of one who has travelled 7,000 miles through the country and received not only in the capital, but even in the remoter parts of the Empire, more consideration and politeness than he had ever thought would be accorded to him. (Applause.)

General Chapman said it was usual after one of these lectures to invite discussions or criticism, but before doing so, he was anxious to put before them the extreme importance of the work done by Lieutenant Younghusband. If they looked at the diagram before them they would see the length of the journey, and the conclusion of it had brought him across one of the most difficult passes that separated Yarkund from Kashmir, and obliged him to cross a glacier which he (General Chapman) believed had not been crossed before, and across which no road was supposed to exist. He had arrived in Kashmir without any assistance, but what was due to his own energy and pluck. With reference to what Lieutenant Younghusband had told them, he thought it was very striking the great development which was now being given all over the world to enterprise in relation to commercial, as well as for military purposes. If they took the *Times* received two weeks ago, and looked at the speech by Sir Charles Wilson delivered before the British Association at Bath, they would understand something of the relation which scientific exploration bore to the development of our commercial relations all over the world, and how important it was at the present time that England should maintain her commercial supremacy as well as her control of the Sea. In the *Times* of 8th September, they would find that a charter had been granted to the Imperial British East African Company, a company which had been organised for the developement of commerce and the extension of our influence from the coast north of Zanzibar, going further south, if they read a book by Professor Wallace on African travel, they would see the value which was attached to the land of the Zambesi, and they would understand how Englishmen in every direction were being inspired to undertake adventurous journeys for the good of their country. He was anxious they should appreciate the work Lieutenant Younghusband had done, for it was not often that a man, who came into that room would look back on such an adventurous journey as he had successfully accomplished in 1885-86.

In answer to a question asked, Lieutenant Younghusband said that in all towns, he had found Russian cotton goods for sale, partly by Chinamen and partly by Russian subjects from Turkestan. Russian goods had even been brought into Leh, Ladak and Kashmir. They were exceedingly good and suited the inhabitants.

In conclusion, General Chapman said that within the last few days they had heard that the distinguished traveller Dr. Landsell was expected at Leh. He was a well-known philanthropist and a great traveller in Siberia. They had known some months ago that he had left England, but they had only heard recently that he intended coming to India. He was running considerably risk. and, if he got across the passes before the snow fell, it would be a good thing for him. He (General Chapman) desired in the name of those present to thank Lieutenant Younghusband for his lecture, and he considered that what he had done might induce them to hope that he had more adventures and travels before him.

The meeting then separated.

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MACHINE GUNS AND THEIR USE IN THE FIELD.

A LECTURE DELIVERED BY

MAJOR A. D. ANDERSON, R. A.

Lieut.-General THE HON'BLE G. T. CHESNEY, C. B., C. S. I., C. I. E., R. E.
in the Chair.

I must preface my remarks by apologising to readers of the Royal United Service Institution Journal for inflicting on them what may be called a repetition of the views urged by me in a short paper read in Whitehall Yard by Major Hime, R. A. in 1886. My excuse, may, I hope be, that owing to the receipt of a sudden order to embark for India, the paper was incomplete, and those deficiencies I will now endeavour to rectify. On the former occasion it was advocated:

(*a*)—That Machine Guns, be they Gardner, Gatling, Nordenfeldt or Hotchkiss, and we may now add Maxim, should be fitted on pack mountings for transport on mules, as being more able in this manner to accompany Infantry in all their movements, and the most simple and economical way of transporting them.

(*b*)—That they should be attached, one to each company of Infantry as part of its equipment, carried on a mule, with a 2nd mule carrying ammunition; to be worked by two, three, or four men of the company as required, and to accompany them on all movements except as hereafter described.

The advantages urged for this are; that interest in the weapon would be taken by the company; a fair number of the men would be instructed in its use, and it would be available to the hand of the Company Commander in the many instances when its support must prove invaluable, the fire-power of the company being materially increased.

That preparatory instruction and practice in the handling of these weapons is necesssary will be understood by all who have seen the fitful way in which they have been treated hitherto.

We may with advantage, as an instance of this, quote the words of Lord Charles Beresford from his Lecture at the United Service Institution in 1884. When speaking of the use of the Mitrailleurs by the French in 1870-71 he said "whole battalions were manned by men and officers who had never worked or even seen this new and complicated war machine, (and this alone was enough to invite a disaster) they always endeavoured to use them as guns, instead of as clusters of rifles which they really were, and in fact he said there were no possible mistakes which they did not commit with these Mitrailleurs in the earlier part of the war, and it was not until later that the man killing power of these guns was fully proved." He then went on to quote how at St. Privat the 4th Brigade of German Guards under Mitrailleur and long range fire combined, lost 6,000 men in 10 minutes at a range of over 1,500 yards, and had to withdraw; how at Mars-la-Tour, 5 Battalions of Prussian Infantry in one advance lost 72 out of 92 officers, and 2,545 men out of 4,546, in fact, that whenever the machine gun got into action where it could be really useful, its fire was simply devastating.

On the other hand the failures from one cause or another, of the Mitrailleurs during this war were so numerous, that at its conclusion when the opinion of the German Artillery Commanders was taken as to the wisdom of introducing them into their army, possibly at the cost of the artillery, the almost unanimous verdict was, that they would not sacrifice a single gun for them,

This decision undoubtedly, more or less unjustly, threw discredit on Machine guns, and put a temporary check on their introduction, chiefly owing to the imperfections in the weapons themselves Since those days they have been used in a desultory manner by English troops with varying success, the general opinion being, that until they jammed they proved invaluable; but manufacturers have gone on improving their weapons, and they are fast approaching the time it is hoped, when the inherent faults in the guns, will not be able to be urged as against their introduction.

In the Maxim gun up to the present, the best results appear to have been obtained

For it the advantages claimed are:—

(*a*)—Rapidity of fire amounting to as much as 600 rounds per minute—

(*b*)—Ease of manipulation.

(*c*)—Absence of all muscular exertion on the part of the firer, the recoil of the barrel working the feeding gear.

(*d*)—Owing to the system of lateral automatic feeding, only one man is required to work it.

(*e*)—Lightness as compared with other Machine guns and also the lightness of the feeding system.

(*f*)—Jamming from a "hang-fire" is impossible, because, if the cartridge does not explode, there will be no recoil, and without recoil the gun ceases to work.

(*g*)—The facility with which the breech bolt, which practically means the entire mechanism, can be removed and changed.

As regards the astonishing accuracy of the gun we have lately had a multiplicity of proofs; for our purpose it may suffice to consider the last (which we saw reported a few mails ago) viz. a trial between a machine gun and 15 selected infantry men—

	Maxim.	15—1st or 2nd class shots with *M. H. Rifles.*
600 yards	150 shots..................	10 Volleys = 150 shots.
	81·56 per cent hits in 2′ 36″ –	52 per cent hits in 3′ 36″
800 yards	150 shots..................	10 Volleys = 150 shots.
	80 per cent hits in 1′ 30″ –	40·66 per cent hits in 3′ 40″

Working this out roughly, the results in the 600 yards trial put the Maxim on a par with about 32 men, while at 800 yards it was equal to the firing of 73 men, so that we are, it is thought, justified in considering the weapon if handled by skilled men is equivalent to the fire of 50 rifles, Mr. Maxim is confident that at the longer ranges he will work his gun still further ahead of the rifles and there appears nothing in theory to lead us to suppose he will not be proved to be right.

Our experiences of the last few years, have it is thought also set at rest many theories regarding the tactical use of them; they were to be handled by the Artillery, or be formed into separate Batteries, and supersede them; they were to be attached to Cavalry, or they were to be worked in conjunction with Infantry. That they could supersede Artillery or remain in action opposed to the Guns of the present day, is accepted as out of the question, wherever worked they must seek to expose themselves as little as possible and take advantage of all available cover from whence to pour out their murderous shower of lead.

That Cavalry could in any way neglect their own important duties in the Field to work Machine guns except in a very small way or on exceptional occasions has never been seriously dreamt of, and it has gradually become an accepted fact, that if to be used in the Field, Machine guns must be worked by Infantry and form a Reserve to that arm of the service of whose fire their is but a multiple.

This Theory was practically accepted at the discussion on my former paper, except by two Artillery Officers, one of whom would give all to Engineers, and the other would work them on wheels as separate units; the former idea will it is thought, not be accepted even by Engineer Officers themselves, while as regards the latter a complete organization of Batteries of Machine guns would doubtless be of great value, but it means money, and probably a reduction to meet the expenditure, of one of the other three fighting arms, which we can ill spare. We are therefore, it is thought, justified in endeavouring to get them introduced in what may deemed the most natural and certainly the most economical manner.

That they could be economically introduced as part of the equipment of each Infantry Company is apparent from the following figures, which are rough estimates.

Cost of gun	... ...	Rs. 2,250
„ pack saddle for gun	... „	18
„ „ „ ammunition	„	14

Or about Rs. 2,500 for Company.

In the above calculation, no count has been taken of the mules required for guns or ammunition, in all 16 per Regiment, for the following reasons :—

Mules need not be kept up in peace time, because neither they nor their Drivers require any instruction to fit them to carry about, either gun or ammuntion, there being practically no drill to learn beyond what could be compassed by a minimum amount of common sense; thus any Mules or Drivers from Regiments, Transport Depots or from Mountain Batteries would suffice to do the work for the day at Field days, &c., and enable the men to be sufficiently instructed. Only on Mobilization would an outlay on Mules have to be incurred to to the extent of upon the first half cease firing and move up either to re-inforce the other sixteen then in action or to push forward all, or a portion of them, By this means, if we detail 3 men per company or 24 per Battalion for the service of Machine guns, each estimated to be equal to the fire of 50 men, we at once increase the fire power of the Battalion by 400 men, or supposing it goes into action 800 strong, by half its number.

To the Infantry Company Commander a variety of ways will suggest themselves of using such a gun if working with his company. On any detached duty the weapon will be found invaluable either in defence or attack to strengthen a weak point, to bring a specially heavy fire on any selected point, to cover the movements of his men, or in numberless ways to do their work and spare them.

To the Battalion, Brigade or Divisional Commander, the power must be given to collect the Machine guns from the various companies, and massing them on suitably selected spots or in groups in a variety of positions, strengthen weak points, multiply the fire on points of attack and generally cover the movements of the Infantry.

The advantages that may justly be claimed for the use of Machine guns are it is thought.

I.—Not as supposed by some, the power of pushing them on with the Infantry to within 3, 4 or 500 yards of the enemy; this would indeed with a weapon that is as effective from 800 to 1,200 yards or more, as from 3 to 600, excepting the greater difficulty of judging distance and results at the longer ranges, be needlessly sacrificing the men and mules with the guns, but the possession of a force, composed in the case of a Brigade, or 4 Battalions, of 32 Machine guns, available for any purpose, but primarily long range fire at any distance under 2,000 yards, capable of discharging bullets at the lowest computation at a rate of 3,200 shots a minute, and equal to the fire of 1,600 men. That Machine guns fitted with shields may eventually be able to push on with the Infantry, if necessary, under certain circumstances, appears however very probable.

II.—The attacking line (now practically the whole available force) is free to advance without leaving a man behind for long range fire, beyond the 96 with the Machine guns, and without firing at the long ranges, in the formation most suitable to the ground, and the occasion, and push up as far towards the enemy's position as circumstances will permit.

Here, if any cover be available, a short pause to rest the men, complete formations and prepare for the final advance over the last 4 to 600 hundred yards will be invaluable.

III.—The men reach this point, say 620 yards, with their ammunition pouches and perhaps pockets full (70 to 100 rounds each) and need cause but little anxiety as to their supply sufficing for the actual advance; of course if they open fire from this position for some time previous to the attack, supplies would have to be pushed on to them, but in the majority of cases the chief demand for ammunition would be for a continuous supply for the Machine guns.

The advance having been made without firing, the whole condition of the men would be calmer, steadier, less excited than if they had, as is the ordinary custom, advanced from 1,200 or 1,500 yards firing at every 50 or 100 paces, their shoulders would be strong and fresh to commence firing from, (a very important factor it is believed for a native or in fact any soldier with the rifles of the present day) and lastly their rifles would be cool. The Infantry must expect certain losses in their advance from 1,500 to 600 yards, but not so great as if they had to cover the ground with a view to firing throughout their advance, while the volume of fire that could be delivered by the 32 Machine guns of a Brigade on the enemy's Infantry would be greater than a Commander could afford to furnish by leaving behind a portion of his force in the long range positions, and it is submitted more steady and accurate, if only the Machine guns get a fair chance with men thoroughly skilled in the working of them.

It may be added, there is nothing in this system of attack to interfere with the idea gradually gaining ground, that an Infantry attack should be covered by a cloud of sharpshooters, picked shots, who from vantage points shall keep up an accurate fire on any weak spots displayed by the enemy, and thus aid the troops advancing to the attack, this could and probably would be done if opportunities offered, having regard to not unduly weakening the main line

We next come to the handling or manœuvring of the Machine guns. As before said, being portion of the Company, the Company Commander would see that intelligent smart men, for choice Non-Commissioned Officers, were detailed to work them, and in all detached movements the gun would be at his disposal and under his orders.

When two or more Companies or the whole Battalion, Brigade or Division are working together, it should lie with the Senior Officer to dispose of the Machine guns.

To this end he would perhaps deem it necessary to detach one officer per 8 guns from each Battalion, and one Senior officer per Brigade in Command of the whole 32.

Experience in working in this way would show how far this could be carried out from the present strength of officers with Battalions, it is thought that under the system of linked Battalions which should enable Corps to take the Field full strength, it could be done without an increase.

As before stated no particular intelligence or knowledge of drill would be required from the Mule Driver, beyond being able to take his mule with its load in company with others and keep out of difficulties and other peoples' way.

The tactics of the Machine guns when massed might be somewhat as follows :—

Taking a Brigade as an example; at the commencement of the action a position would be occupied say 1,800 yards from the enemy by as many Machine guns as there was space or work, perhaps 16.—The Infantry with the other 16 Machine guns moving forward under cover to perhaps 1,200 yards, where the second half of the Machine guns finding suitable cover would perhaps take up their position and open fire ; thereupon the first half cease firing and move up either to re-inforce the other sixteen then in action or to push forward all, or a portion of them, of machine guns, and nothing it is thought should be allowed to stand before the supply of what is deemed a sufficiency of am-upon the first half cease firing and move up either to re-inforce the other sixteen then in action or to push forward all, or a portion of them, to the front, avoiding the line of fire of those in action, or to a flank, as opportunities of ground might offer.

The main body of the Infantry and to whose movements all action of the Machine guns should conform as an adjunct or support, meanwhile continue their careful and cautious advance, in their endeavour to get as close as possible up to the enemy with the least amount of risk and fatigue to themselves.

If Machine guns be pushed away to a flank, they should as is the case with artillery, be supported by infantry in proportion to their numbers to save them from being rushed; if fighting in the main line they can be trusted to hold their own front and they have the support of the troops on either side or possibly in front of them.

In putting forward proposals of this sort it is advisable to endeavour if possible, to meet the various doubts and fears and objections with which all innovations are justly met, by attempting to explain them away.

1stly.—It is proposed by some that Machine guns shall be worked on wheels, and in batteries as separate units.

A careful consideration of that theory will it is confidently believed tend to the conclusion that such a system would lead to far greater expense, while beyond handiness in manœuvring from practice together, there is nothing to cause us to believe they would be any more accurately fired, which is the crucial point, by an established corps than by the men selected by the various companies, supposing advantages of practice etc., to be alike.

Also to obtain these expensive separate units, we must be prepared to give up something of Artillery, Cavalry or Infantry and all will doubtless agree that we are not willing to give a man, if we can attain our object any other way.

Secondly.—It is said that Machine guns cannot stand against Artillery fire, but neither can our Infantry soldier; if searched out by effective Artillery fire we must move our position, seek cover, or in fact get out of it, if we canot crush it by stronger Artillery fire; but just as the Cavalry and Infantry soldier have to run the risk of Artillery fire, and just as the varieties of ground and the changing incidents of every battle field offer to all, opportunities of making themselves useful and working towards the common end, so must Machine guns look out for themselves, seek for and seize or make opportunities and positions with the certainty that with their immense range and great accuracy of fire there will always be plenty of room and occupation for them so long as their ammunition lasts.

Thirdly.—We hear the Infantry officer say, I would rather give our men more ammunition for practice and make them shoot better, than go in for Machine guns, a very excellent theory, but it is submitted apart from the question.

The shooting of the Infantry cannot be raised to too high a pitch, and must always be encouraged irrespective of the introduction or otherwise of Machine guns, and nothing it is thought should be allowed to stand before the supply of what is deemed a sufficiency of ammunition ; reduce the soldier's ration, stop his beer or speaking seriously, stop expenditure in any other way but do not allow lack of ammunition to stand in the way of good shooting, for the whole Military Budget is but so much money wasted, if the soldier can't shoot.

We would however ask the Infantry Officer in command of a single company ; if required to rush a village from which a heavy infantry fire was being delivered and which fire it was very desirable to keep under, would he not be thankful of a Machine gun to post under cover at 800 or 1000 yards in preference to having to leave 20 or 30 of his men to cover his advance and which he would have to drive home with perhaps 70 instead of 100 men. Again if his company were rushed by superior numbers, would not a Machine gun in the middle of his company, at the corner of the square, or where the enemy were pressing heaviest, be an invaluable assistance, bearing in mind that he attains this increase of fire at the cost of 3 men, it is thought the answer can but be in the affirmative.

In the British Army as a body, there exists a feeling of self contentment or satisfaction with our own condition and fighting powers, which without careful attention is liable to lead us into difficulties- Excellent though such a feeling may be it cannot justify our ignoring the importance of superiority of weapons or numbers, which might at any moment turn the day, and satisfied though the Infantry officer may be with what he has, it would be veritable madness to launch his men into a conflict with an adversary better armed or possessed of weapons in any way likely to afford him any advantage, in addition to what he already would have *viz.* numbers.

Fourthly.—Others argue that Machine guns should take the place of Horse Artillery in the Cavalry Brigade.

Now valuable as Machine guns might be with Cavalry, if carried in a sufficiently mobile manner to admit of their keeping up with them, it can it is thought only be as an adjunct to the present organisation of a Cavalry Regiment perhaps carried on a horse, but certainly never in supersession of Horse Artillery, for the simple reason that in the majority, of cases they would be directly opposed by Artillery, which as before mentioned, if the Artillery are able to devote their undivided attention to them, unopposed by other Artillery, can only mean their annihilation or their having to keep very much under cover or in the back ground.

In connection with this however, the system of "Quick-firing Guns" which is making such strides in advance is worthy of attention. As distinctly as the rifle is the weapon of the Infantry soldier, so should the Machine gun be ; and as rightly as is the cannon the weapon of the artilleryman, so it is thought will the "Quick Firer" or some adaptation of it be his arm also, if introduced for Field Service.

The system has achieved marvellous results by control over recoil ; and in using made-up ammunition, by its rapidity of Fire ; but owing to the impossibility of meeting its large requirements in the shape of "Amunition supply in the Field," and the difficulty in providing a Serviceable Shrapnell Shell and time Fuze its development for use in the Field is temporarily at a stand-still

These difficulties will doubtless be overcome and if so, it is thought its other undoubted advantages are bound to force themselves in to consideration for adapation in our Field Artillery.

To return to the Machine guns all concur in agreeing that to the "Defence" these weapons are still more valuable than to the "Attack," but thus far they have only been practically accepted for Fortresses, Field Works, &c.; here again it is urged we would be permitting an immense item of fire power to lie undeveloped should we neglect to utilize them in defensive positions in the Field, where, with the opportunities available of studying the possible line of attack, behind cover, natural or artificial, an unlimited ammunition supply, and possibly with ranges measured before hand, they could not but prove an invaluable adjunct to any line of defence.

Their mobility, if carried as proposed, would admit of their being moved from point to point as desired, and advancing or retiring with the Infantry line; whole it would rest with the Commander whether the demands of the moment and position required their being worked with their respective companies or in masses.

That such guns would in many instances have proved invaluable must be apparent to those who have thought over any of the hard-fought little battles in which our Army in India is perpetually engaged.

It may be truly said that owing to the smallness of our numbers, we fight all "played out" as the saying is; that we have seldom a reserve to fall back upon or an Army Corps, Division or Brigade in support, to whose arrival we may look, but have to fight it out as we stand, and if any little accident or piece of mis-management occurs, we suffer defeat or run greater risks than we should.

For instances, we need seek no further than the last Afghan War.

Sir Donald Stewart fought the battle of Ahmed Kheyl with

699 Cavalry.
1790 Infantry and Sappers
and 18 Guns.

against a force of Afghans estimated at a 1,000 Horse and 12,000 to 15,000 foot or with odds of say 5 to 1 against him in numbers, for his first Brigade though only at the rear of the Baggage column were not able to arrive in time.

We read that "the onslaught of fanatic swordsmen was at times so rapid and was pushed with such desperation, that during the few minutes which followed, it became necessary to place every man of the reserve in the firing line." Here Machine guns would have been of great assistance.

Again the battle of Maiwand was fought by General Burrows with

576 Cavalry.
1,834 Infantry.
12 Guns.

against a force computed at 25,000 with 30 guns; if we put it at half that number the odds were over 5 to 1 against him. He would in this case have had 24 Machine guns available and it must be evident that whether all posted among the Infantry, or some on his left flank to check the rush of the masses of the enemy, their fire at the rate of say 100 rounds per minute per gun and probably much faster would have been invaluable to the out-numbered little force at General Burrows' disposal.

The whole subject hinges on the point; is long range musketry fire a necessity?

All that we can gather from the 70-71 and 77-78 campaigns shews conclusively that to expect men to advance from 2,000 to 600 yards, against an insufficiently molested force of Infantry is to invite heavy loss and with it its accompanying amount of demoralization.

The Germans in spite of a well-served artillery suffered heavily against their better armed adversaries although they speedily adopted extended formations, and when they commenced to open fire themselves, at 700 and 600 yards the shooting of their opponents became wild and less harmful.

The Turks with their "Martini-Peabody" rifles and an almost inexhaustible supply of ammunition, on the defensive, commenced an uncontrolled, almost unaimed fire at as much as 2,500 yards, and inflicted immense damage on the advancing Russians, who adhered to their close formations and were driven to allowing their Infantry to open fire sooner than they otherwise would, to in some way intimidate their opponents.

We have yet to learn what long range Infantry or Machine gun fire, scientifically used, under proper control can effect; but we have sufficient proof from battle-fields and the ranges, to shew, that with the long ranging rifles of the present day:

(*a*) Long range fire will always be used by the defence.

(*b*) If the "attack" neglect to rivet the attention of the enemy by a sufficiently powerful shooting line, be it artillery or long range infantry fire of its own, it will be tantamount to courting heavy loss.

(*c*) The provision of long range fire either for the attack or defence but more especially for the former is a very material help to the soldier of the actual attacking line in a variety of ways, as he has his own special work to perform.

The delay that has occurred in the adoption of Machine guns is rather astonishing when we read some of the views held in May 1883.

Viscount Wolseley at R. U. S. I., said "I quite agree as to the use of the Machine Gun in the field. I believe there is an enormous future for it, for the very reason that it will increase the effect and will aid in the power of long range infantry Volley-firing. The Machine gun will take the place of considerable bodies of men and when supplied with plenty of ammunition, *which it is the duty of those who have charge of an Army to provide*, I believe there is a very great future for the Machine guns, and that that General or that nation which knows how to develope or make use of it in future will have a very great opportunity, an opportunity that has never been made use of by any one before.

But the requirements from a Weapon for introduction for Field Service use, are so numerous and varied, that we are it is thought justified in saying this delay has been caused, by the absence of a perfect weapon, and towards supplying which the "Maxim Gun" appears to be the nearest possible approach.

Admitting therefore that long range fire is a necessity in civilized warfare we may pass on to the main difficulty connected with the use of Machine guns in the Field "the supply of ammunition" of which undoubtedly a larger quantity becomes necessary, and at the first blush to provide for weapons, to the extent of 8 per battalion, capable of firing away ammunition at the rate of from 100 to 200 rounds per minute, appears a very formidable matter.

A little consideration of the subject however minimizes the obstacles to be overcome.

We may start the consideration of it by stating that the real want of a largely increased supply will only be felt in civilized warfare, since against uncivilized races, the object is not to frighten the enemy away by long range shooting or to subdue their fire, for they have none worthy of the name, but to reserve our own fire for the shorter distances where its full effect can best be obtained, and since, owing to the short duration of these fights, it may as a general statement be said that men have never been stopped for want of ammunition. With civilized nations however, where battles last throughout a day or more, and where it is accepted that the attacks must be divided into two stages, the "preparatory" and the "executive," and a portion of that "preparation" shall be infantry rifle fire, the question becomes one of the first magnitude, owing to the fact, that if the long range fire be carried out by Machine guns, their expenditure of ammunition will be greater than that of a proportionate number of men.

All civilized nations agree as to the difficulty of supplyfng ammunition to infantry attacking, or the "Executive" portion, once they commence to advance, and that each man should carry the largest possible amount on his person, while some give him an extra 30 to 40 rounds before starting, (the Germans give 20) making up from 100 to 120 rounds on the man.

We content ourselves with giving him 70 rounds, and it is thought with justice.

If we accept the fact that the advance of the fighting line should be prepared and covered by artillery and long range or machine gun fire, that they should not themselves fire till at least within 700 yards, or it may be hoped less, of their enemy, and that undisciplined, uncontrolled fire is, we trust now, in our army, giving way to Fire Discipline and Control " with its attendant checks on waste of ammunition, we are it is thought justified in considering that it is better not to overburden the man with more weight than is necessary and that 70 rounds should suffice.

These 70 rounds of the present ammunition weigh 7·4 lbs. and the introduction of the new rifle ·303 bore with its cartridge weighing, complete, 1 oz. would give us with the man about 116 rounds, a very liberal supply, without increasing the weight on him; while the Officer Commanding the Battalion is responsible for another 40 rounds per rifle (50 in India) in regimental charge, which would be increased with the new lighter ammunition. He can keep this as close up as he likes and it is submitted no requirements of machine guns should be allowed to trench upon it.

It may be useful here to state the distribution of ammunition in our army.

Rounds per rifle.	England.	Rounds per rifle.	India.
70	Carried by the soldier	70	Carried by the soldier.
30	In 4, S. ammunition carts and on 2 mules accompanying the regiment	50	1st Regimental Reserve on mules.
10	In the Regimental Baggage Wagons		
40	In the Divisional Ammunition columns	80	2nd Regimental Reserve on mules if available, if not so, on camels or other conveyance.
30	In the Army Corps Ammunition column, while an extra 300 rounds per rifle is carried in Ordnance charge making 480 in all		
180		200	
		200	In Ordnance charge, on whatever carriage is procurable.
		400	

Thus it appears that under the new system in England they have 40 as against our 50 rounds in the 1st Regimental Reserve, and 70 against our 80 in the second, with the ammunition columns.

Let us now consider how much ammunition should be taken into the field per machine gun and how and where it can best be carried. Quoting from that excellent authority "Infantry Fire Tactics" by Lieutenant Mayne, R.E., we find that in short range fire

The Russians in 1886, averaged from 7 to 12 rounds per man
highest consumption 80 ... ... ditto.
The French Army of Metz 1870 averaged from 25 to 30 ... ... ditto.
The German XIIth Army Corps 1870-71 average from 6 to 15 ... ... ditto-
The Russians in 1877-78 expended 50 the highest consumption being 94 ... ditto.
While in long range fire
The French Army at St. Privat fired away 90 ditto.
and had to retire for want of ammunition
The French Army at Champigny fired away nearly 108 ... ... ditto.
The German Army in 1870-71 if unable to advance, fired away all their ammunition and had to draw on their columns.
In the Turkish Army 1877-78 some battalions fired 150 ... ... ditto.
in one day, this is the largest expenditure ever known.

From the above it will be seen that the 100 to 120 rounds sent into action on the man or in Regimental reserve has sufficed to meet his wants for short range fire, but that for long fire, the Divisional and Army Corps Columns, or in India the 2nd Regimental Reserve, would have to be dipped into, but that judging from the maximum expenditure in one day, the provision per rifle in England of 180 rounds, and in India 200 rounds, is sufficient for either short or long range fire.

We shall therefore it is thought be safe if we take the above data as our foundation for the supply for machine guns, viz., the Indian scale of 200 rounds per rifle, and counting a Machine Gun as equivalent to 50 rifles which is the usual rough estimate of its power of fire, calculate that 10,000 rounds per piece in the Field should be provided.

Practical experience can of course be the sole test of an estimate of this sort, but it appears fair to suppose that though one gun could find opportunities for expending that amount in one day, the whole eight of a Battalion would not be likely to be called on to fire away 80,000 rounds. In working this out we are it is thought justified in taking as our basis the cartridge of the new ·303 rifle under trial, weighing 1 oz., for even if that small-bore rifle be not introduced, some other will be, and the calibre of the Machine gun of the future must follow the rifle, owing to supply of ammunition.

Thus, if 1 Box of Martini Henry Ammunition weighs 78 lbs. and contains 600 rounds, we may calculate that a similar box would hold 1,000 rounds of ammunition of a smaller diameter, (it actually works out to 1056). Two of these form the load for one mule about 156 lbs., exclusive of saddlery &c., and would under the present proposal of one mule per Machine gun, for ammunition, provide 2,000 rounds per piece always with it. For the transport of the remaining 8,000 rounds or 8 boxes weighing about 624 lbs. if carried on Mules, four would be required or 32 per Battalion, 128 per Brigade and so on, a too formidable addition to transport requirements and to the general following of the Army, but on the English plan these 8 Boxes (624 lbs., 8,000 rounds per gun, or a total of 64 boxes with 64,000 rounds per Battalion) weighing 4,992 lbs. would be put into 4, S, A, ammunition carts, each cart carrying as at present 16 boxes, and attached to the Divisional Ammunition column, increasing it by 52 for the whole Division exclusive of sappers, and by a smaller number if a proportion of G. S. Wagons are used; a portion of this would probably be relegated to the Army Corps column and doubtless in England would be, but in this country it would all have to move in the 2nd Regimental Reserve with the Ammunition columns.

Just as in Europe it is more advantageous to carry Reserve Ammunition on Carts and Wagons, in preference to Pack Transport, it is submitted in Eastern Warfare, while admitting that owing to the absence of roads we must adopt mules for our 1st Regimental Reserve, and if need be for a portion of our 2nd, we should not with the remainder of the 2nd Reserve trust to camels and such like, losing the undoubted power to be gained by cart over pack Transport, in the case of Mules estimated at from 3 to 4 to 1, but for the bulk of the 2nd Regimental Reserve put it on wheels.

It will probably be admitted that no form of cart in India does its work better than the mail tonga, with its broad track, not too high wheels, and stout serviceable make, enabling two ponies to take their load (600 lbs. but often a great deal more) up and down hill at a very respectable pace.

One of these, slightly altered, drawn by two mules and driven by a native would carry 8 Boxes, 624 lbs. weight, with 8,000 rounds, and necessitate an increase for the 13 Battalions of the Division of 104 Tongas.

The practical working out on a small scale of a proposal of this sort is the only way to accurately estimate the requirements, when it would be found that the figures given are not over sanguine calculations, inasmuch as

(*a*)—The estimate of the number of cartridges a S.A. Ammunition box will hold, is under stated.

(*b*)—Solid drawn metal cartridge cases will admit of lighter S.A. Ammunition boxes, perhaps canvas ones, and of more rounds being carried.

(*c*)—The supply of ammunition allowed for the Machine gun, is it is submitted a very liberal one.

All of which would go to lessen the transport required.

As to the disposal of these tongas or carts with Machine gun ammunition, it is thought their place must be as before stated, with the ammunition column of the Division, unless otherwise specially required. So placed, our books tell us, they would be 2 or 3 miles from the head of the column, but we may say 6 to 8 or 10 miles therefrom, and in view of the fact that each machine gun has on its ammunition mule 2,000 rounds, and that it forms part of the duty of the Commander of the ammunition column on the first rumour or symptom of a fight to push the whole or part of his ammunition up as close to the scene of action as opportunities will permit, this would appear to be the most practical disposition, while the Machine guns with their ammunition mules moved with their respective companies.

The increase to the following of the troops in India would under this proposal be.

Per Battalion..
- 8 Machine guns.
- 16 Mules with Saddlery with 16 drivers.
- 8 Tongas.
- 16 Mules with harness with 8 drivers.

or in all 32 mules and 24 drivers.

Per Division...
- 104 machine guns.
- 104 Tongas.
- 416 Mules with 312 drivers.

while the cost would be, estimating each Machine gun at £150[*] or Rs. 2,250 and each Tonga at Rs. 200,

104 Machine guns = Rs. 234,000.
104 Tongas = „ 2,800.

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[*] This is quite a rough estimate based on the cost of the single barrelled Gardner.

or Rs. 254,800 per Division of the Army, and for the whole Army in India consisting of 192 Battalions Rs. 37,63,200.

The cost of Mules of which 2,080 would be required for this purpose on the mobilization of 2 Army Corps and one Reserve Division has been omitted as they would only be required when war breaks out, and as before stated, there are sufficient mules in every cantonment to admit of instruction being carried out and mules should not require any special training for such work.

Thus for an expenditure of less then £300,000 we would be enabled to increase the fire of our Infantry by one half (for few Infantry regiments go into action 800 strong if that) without appreciably reducing the fighting strength of the Battalions or sacrificing any other Branch of the service to attain our object.

In conclusion, I would quote in support of the arguments here urged the words of Sir Edward Hamley, who said "I think it is indisputable that provided two forces otherwise equal, are face to face, and the one that attacks can succeed in bringing up a line of Machine guns at such a distance as to bear effectively upon the enemy's position, an immense advantage will be gained in thus covering the otherwise very difficult attack of the Infantry."

That is all I have been desirous of proving, for I feel confident that study of the subject, or trials of the guns, at field firing, either singly or in masses, can, if the men handling the Machine Guns have a chance of doing so efficiently, lead but to one conviction, that setting aside the numerous other advantages claimed, the fire-power of the battalion under the organization proposed, becomes enormously increased. Further, when we bear in mind the uniform condition of the English armies in all parts of the world, but especially in India, of inferiority in numbers, and know that we can only counteract this by the perfection of our arms, and the rapidity and accuracy of our fire, it is submitted that not only should we prove beyond any possibilily of doubt that we cannot turn to our own account weapons so marvellously accurate and murderously effective, but we should be very careful that we do not find our troops driven to contend against them in the hands of our enemy, without having them ourselves, in addition to what we are accustomed to expect, their superioriority of numbers.

ALEXANDER PRIZE ESSAY, 1888.

On the relations between the Food and Work of the British Soldier, and their proper adjustment in Peace and War. On the occurrence of Scurvy among troops, and its prevention: and on the use of Preserved and Concentrated Foods, with suggestions for alterations or improvements in the existing rations and times of meals.

By Surgeon R. H. Firth, F. R. C. S., Eng., *Medical Staff.*

Motto. " *Uti ratio sine experimentis mendax* "
" *Ita experientia sine ratione fallax.* "

Introduction.—Frederick the Great is reported to have remarked "on sait que qui veut bâtir l'edifice d'une armée, doit prendre le " "ventre pour fondement," and history is not without evidence that the great king of Prussia was correct in his views as to the relation of the soldier to his food. Recognizing the fact, that not only the soldier but man generally is much the creature of his diet—that his physical perfection, his intellectual activity and his moral tone are dependent on the food he receives and the uses he is able to make of it—it is not surprising to find that from the earliest times the question of Diet, and the part food played in the human economy was one which occupied the minds of the thoughtful, and even among the Philosophers of Greece went so far as to constitute a system of medicine. Descriptions of the feeding of the ancient Persian and Egyptian soldiery are given by Strabo, Diodorus, Herodotus and others, while Xenophon, Plato, Tacitus, Vitrurius and Vegetius give us an insight into the eating and drinking of the Greek and Roman. Their writings testify to an adequate recognition by the ancients of the value of proper food to the soldiery as a means to the maintenance of their efficiency.

The general outlines of a man's mental character and physical tendencies are doubtless largely determined by the impress of race and family: that is to say, the scheme of the building, its main characteristics and dimensions are inherited, but to a large degree the materials and filling in of the framework depend in regard to their quality upon his food and training. Such being the case of the population in general, how much more important is the good feeding of the soldier of a country, on whom and upon whose moral and physical efficiency so much depends. As the question of the adequate adjustment of the food and Work of the British Soldier involves a due appreciation of the physiological principles of diet, it is necessary to consider, briefly, the nature of the alimentary substance, their physiological uses, and the principles which concern and govern food selection.

Part I.—Adopting the definition of Sir William Aitken* we may say that "food represents a combination of alimentary substances"

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* Aitken's Medicine. Vol. I page 1118.

"containing certain elements suitable to digestion and assimilation," "all of which are necessary and sufficient to maintain healthy nu-" "trition: and by its latent or potential energy goes to maintain the" "body in all its functions of healthy life under variable circumstances."

In the alimentation of masses of men, subjected to exposure and also frequently called upon to perform great bodily labour, the question of food is of the greatest importance. More especially is it the case in the army where the greater or lesser collection of men resembles a Machine to which a certain quantity of material must be supplied in order to produce the requisite amount of Force, at the moment such Force is called upon to be delivered. Viewed in this manner all Foods represent stored up Force, and their function consists in the development and manifestation of it in molecular and muscular movements and chemical changes The force evolved in the conversion of the chemical combinations of the ingesta into those of the egesta is the representation of the active manifestations of animal life.

If the products egested from the system were fully oxidized principles, then the Force developed in the body, should equal that contained in the ingesta in a latent state. However such is not quite the case. Some latent Force still remains in the egesta.

This practically compels us to express the equation thus. The Force latent in the egesta *plus* the Force developed in the form of vital activity *equals* the Force contained in the food. Hence arises man's demand for food, which is nothing more than that matter capable of maintaining a continuance of vital activity by virtue of the conversion of its latent into actual energy, and which manifests itself in the body as constructive power, heat, mental, muscular and mechanical action. Hence too it is evident that to keep the body in health just as much material must be absorbed and assimilated from the food as is needed for the external and internal work of the body. The classification of the foods necessary to maintain life in its most perfect state, has been usually based upon the deduction of Prout that milk contains all the necessary aliments and in the best form. Such a classification divides alimentary substances into 1. Nitrogenous Matter: 2. Fats: 3. Carbohydrates or the sugars and starches: 4. Water: 5. Salts. These five classes of substances not only are chemically different the one from the other: but physiologically serve different purposes in nutrition.

(1)—The nitrogenous substances in composition are remarkably uniform. They contain about 15 per cent. of Nitrogen, and may be conveniently distinguished by the term *albuminates*. Their foremost purpose, seems to be the supply of material primarily for development, and secondarily for the renovation of the tissues. Nitrogenous matter may be said to be the basis of vital action, and without which no life manifests itself. Liebig's idea that physical action involved a positive loss and waste of muscular and other nitrogenous tissues, entailed the doctrine that the increase of the albuminate constituents of our food was required in proportion to the amount of mechanical labour which the body was called upon to perform. This theory of the relation of Nitrogenous matter to force production has of late years been considerably modified. The experiences of Fick and Wislicenus[*] and the experiments of Parkes,[†] Voit[‡] and Edward Smith[¶] lead to the conclusion that nitrogenous food is not altogether applied to the production of muscular force, except probably as supplying material for nutrition and secretion, and thereby contributing to a well nourished and vigorous state of the system. Further from the experiments of Lawes and Gilbert and from facts connected with the formation of adipocere, we may conclude that nitrogenous substances have a share also in the production of Fat.

(2).—The fats or hydrocarbons chemically considered consist of a fatty acid in combination with a radical. In them only one atom of Hydrogen has its combining epuivalent of oxygen present in the compound, the remaining eight atoms and all the carbon exist in a free state. The labours of Frankland, Lehmann and Smith indicate that it is mainly to the oxidation of the hydrocarbons may be referred the chief production of Power. They are essentially Heat and Force produces.

3—The Carbohydrates or sugars and starches appear from the experiments of Gundback, Edwards, Boussingalt, Lawes and Gilbert to be largely concerned in fat as well as force production : though the experimental evidence on this last point is unsatisfactory.

(4) —When we remember that 58·3 per cent. of the whole body consists of water, the importance of that liquid in the economy is manifest.

(5).—The salts appear to be an integral part of all tissues, and are essential elements in their construction. Experience has shewn that their absence from ordinary food entails marked perversion of nutrition.

There is another class of alimentary substances which requires mentioning. There are the vegetable acids, such as the acetic, citric, malic and tartaric acids. Their precise value in the economy is obscure, but experience teaches that they are concerned in preserving a healthy condition of blood, and appear to play an important part in preventing the disease known as Scurvy : this will be discussed subsequently.

These being the physiological uses of the alimentary substances, individually, it is necessary now, briefly to discuss them, collectively in reference to their powers of maintaining life : whether any one of them alone is capable of supporting vitality, or what combinations of them experience and experiment teach us are useful in the food of man. There is abundant evidence to prove that no one group of alimentary substances is alone sufficient to sustain life for any length of time, but that a mixed diet is necessary. Such evidence is derived from instinctive proclivities, from consideration of the comparative anatomy of our digestive organs, from experience and experiment. That man cannot live on any one group of the alimentry principles is shewn by an examination of the daily needs of the economy, as demonstrated by the egesta. Various experiments by Smith, Parkes, Haughton, Playfair, Fick, Ranke and Vogel* have shewn that an average labourer gives off 307 grains of Nitrogen, and 4694 grains of Carbon daily. If he wishes to keep in health, this daily loss of Nitrogen and Carbon must be made up by a corresponding input of Nitrogen and Carbon with his food. If he subsisted only on an albuminate food principle, say for instance beef which contains 60 grains of Carbon and 10·3 grains of Nitrogen in each ounce; he would in order to obtain his 4694 grains of Carbon have to eat daily no less than 4·7 pounds of that substance: while the required 307 grains of Nitrogen are contained in 1·3 lb. Or to take the suppositious case of a man wishing to live entirely upon Bread (representing the Carbohydrates) having a composition of 116 grains of Carbon, and 5·5 grains of Nitrogen in each ounce: he would have daily to consume 3·1 pounds of Bread in order to obtain the 307 grains of Nitrogen needed by him daily. At the sametime the 4694 grains of Carbon are contained in 2·5 lbs. of bread. Therefore to obtain the proper quantity of Nitrogen, he would be consuming a quantity of bread which contains nearly double the amount of Carbon actually required.

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[*] Gamgee's Physiological Chemistry, Vol. i. Chap. ix.

[†] Parkes in Proceedings of the Royal Society, London. June 20th 1867.

[‡] Untersuchungen üden Eifluss des Kochzalges und der Muskelbewegungen. auf der Stofwechsel, München 1860.

[¶] Smith in Transactions Royal Society, London, Vol. cli. 1862.

The general principles of diet may be summed up in the words of of Professor DeChaumont (*a*) No single nutritive principle whether nitrogenous or carboniferous can support life, except for a very short time. (b) Life may be supported upon one Nitrogenous and one carboniferous principle for a long time, but for a permanency salts would require to be added. Thus albuminates and fat, or albuminates and starches would support life. (*c*) For the best forms of diet, both fats and carbohydrates are needed in addition to nitrogenous matter, and in all probability both starch and sugar among them. It would also appear that a due admixture of more than one form of nitrogenous principles is advisable. The only single article of food that can support life properly is milk, the next best is bread.

Experience teaches us that our requirements as to food vary much with our exposure to different conditions, and that according to the expenditure of our bodies, so should the materials be supplied which are best calculated to yield what is wanted. The human body has been compared to a Machine, but it differs therefrom in this, that wear is constantly going on independently of any useful work done, which is not the case in a mechanical engine. Determinations as to the quantity of food daily required by the body have been obtained by means of extended observations of the diets of communities and classes, and also by estimating the sum of excreted matters, which of course must be compensated by a suitable supply of aliment. From the researches of Playfair, Smith and others, the usual range in the diet of an adult man of Nitrogen daily is 250 to 350 grains. The extremes being 180 grains in a minimum or sustenance diet to 500 grains taken during very great exertion. Of Carbon the daily need seems to be from 3500 to 5500 grains. Smith's observations shew from 135 grains of Nitrogen and 3271 grains of carbon in London needle women to 349 grains of Nitrogen and 6195 grains of Carbon in railway navvies. The diets in English convict prisons show the Nitrogen and Carbon to vary from 226 and 4356 grains in the light labour diets, to 263 and 5013 grains in the hard labours.* The Carbon seems to vary from 3600 to 5800 grains in diets generally. Weston while walking 50 miles daily on the flat and doing 790 foot tons of external work consumed each day on an average 545 grains of Nitrogen and 7879 grains of Carbon, or just about twice the amount of each which will support ordinary work. The experiments of Parkes† and Pettenkofer‡ on men to a great extent confirm the concusions drawn from a study of class diets. Appendix I (modified from Letheby) represents the general results of these observers. To rightly ascertain the value of any diet, it is necessary to determine its value as a force-producer. To this end it is usual to calculate the dynamic value of foods by means of the experimental determinations of Frankland.¶ The index or heat unit adopted is that amount capable when oxidyzed of raising one gramme (15·4 grains) of water one degree centigrade (1·8° Fah.) a kilogrammetre of Force is the representative of the power required to lift one kilogramme (2204 lbs. avoir) one metre 3·28 feet) high. In England it is usual to express the value of a diet in terms of foot tons, (tons lifted one foot) || It has been estimated by Helmholtz that the aminal economy is capable of turning only $\frac{1}{7}$ of the actual energy developed by oxidation of the food to the account of external work, after allowing for the internal work of the body. DeChaumont reckons the internal work to be equal to about 2800 foot tons daily. He has calculated the Potential energy both from food ingested and co-eliminated, and finds them fairly coincident. According to him to get an ordinary days work done (say 300 foot tons) we require five times that amount (1500) of energy in addition to the quantity needed for the body's internal work : or 1500 plus 2800 equals 4300 foot tons. For a harder days work (say 450 foot tons) we need 2550, that is five times the first 300, and seven times the next 150 in addition to the internal work, or 2550 plus 2800 equals 5350 foot tons. The following estimates have been made as to man's work.

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* Letheby's lectures on Food 1872.

Light work,	from	150	to	200	foot tons	each day.
Average	ditto	300	„	350	ditto	ditto.
Hard	ditto	450	„	500	ditto	ditto.
Laborious	ditto	500	„	600	ditto	ditto.

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* T. R. Lewis in Memorandum on Famine Diets, Sanitary Commission Report, India, 1880.

† Parkes on elimination of Nitrogen during Rest and Exercise. Proc. Roy. Soc. Vol. xv. & xvi.

‡ Pettenkofer Leitsch für Biologie Vol. ii p. 459, 1866.

¶ Frankland, Origin of Muscular Power, Lond. Edin and Dubo Phil. Mag 4 Series Vol. xxxii. page 187.

|| Kilogrammetres are convertible into foot tons by multiplying by ·0032285.

Playfair has estimated that the following diet is capable of maintaining existence in absolute repose : that is a mere subsistence.

Substances.	Quantity.	Nitrogen	Carbon.	Salts.	Potential Energy.
	Ounces.	Grains.	Grains.	Grains.	Foot tons.
Albuminates ..	2	138	424	...	346
Fats	5	...	168	...	189
Carbohydrates ..	12	...	2,328	...	1,656
Salts	5	...	...	219	...
N : C : 1:21	15 oz. WF	138	2,920	219	2,191 f.tons.

The Standard diet for average werk is generally accepted as being—

Substances.	Quantity.	Nitrogen.	Carbon.	Salts.	Potential Energy.
	Ounces.	Grains.	Grains.	Grains.	Foot tons.
Albuminates ...	4 6	317·4	977·2	...	795
Fats	3	...	1008	...	1,134
Carbohydrates ...	14·3	...	2774·2	...	1,973
Salts	1·1	...	...	481	...
N : C : 1:14	23 oz. WF.	317·4	4759·4	481	3,902 f. tons.

In the foregoing, the various amounts of alimentary substances are intended as being theoretically free of water.

To summarize we may lay down the following axioms as to the daily wants of man.

As a bare substance, 135 to 200 grains of N. & 3,000 to 3,800 grains of C
At ordinary work,... 2[illegible]0 to 320 ditto 3,800 to 4,500 ditto.
At hard work,......... 320 to 400 ditto 4,500 to 5,500 ditto.

Or, we may say that the average man at average work needs $\frac{1}{20}$ of his own body weight of food, including drink in 24 hours. Of water free food his needs are roughly $\frac{1}{80}$ of his body weight. The ratio of Nitrogen to Carbon should be in a good diet as 1 is to 15.

Such being the general facts regarding Dietetics, it is necessary now to discuss how far the foregoing principals have been, and are now carried out in feeding the British Soldier.

Part II.—The records of the early English armies are so imperfect, that little or no knowledge of their commissariat arrangements has come down to us. It would seem that most of the earlier military levies obtained their rations by forcible contributions from their weaker neighbours.

In Rymers Foldera we are told that Richard I., following the examples of Marcellus and Augustus Cæsar (as related by Vegetius) used to reward those troops which distinguished themselves in battle, by an allowance of wheat at the expense of those who failed to do so. Froude* relates that in 1547 the English Soldiers ration was 2 lbs. of meat, 1 lb. of bread, and 1 pint of red wine. There is evidence that Marlborough had a good commissariat, and kept his armies well fed, but probably most of the older military commanders acted on the maxim that to keep a dog fierce, you must starve him judiciously: and judged that famished troops must be invincible in their ferocity (Harte). It is true that many campaigns have been won by troops both badly fed and badly equipped, but no one could say that those conditions were the causes of their victory. Other things being equal, it is obvious that the best fed and best found army will win the day. Parkes† tells us how that during several of the wars of the last century, so bad and faulty were the commissariat arrangements, that the enterprises had to be abandoned owing to unexampled mortality, mainly from scorbutic disease. The old saying "a mere matter of form like a soldiers breakfast" was only too true, and as for his tea, that was not even a matter form, as it had no existence even in theory. At the beginning of this century, the only meal actually provided for the soldier was the dinner, and he was left to get his breakfast and the evening meal as best he could. Often the breakfast was a dram and a piece of tobacco, while the supper was frequently the same. It was a distinct advance when a regular breakfast of tea or coffee was given. It was not however until 1851 that the evening meal was recognized, and previous to which date the soldier had nothing between his midday meal and his breakfast (scanty as it was) on the following day, except what he might purchase himself.

Down to the sitting of Lord Herbert's Commission in 1857, the diet of the soldier was of despairing monotony. Bread with tea or coffee for breakfast, boiled beef or broth for dinner, followed by bread and tea or coffee for supper. The present ration seems to date from 1813, though since then much modified by additions, the actual weights of Bread and Meat have not been changed.

As affecting troops the question of Food is brought under three conditions.—1st, it must be cheap. 2nd, it must offer sufficient variety to prevent disease such as Scurvy. 3rd, it must be sufficient to supply the Force for the labour demanded of the soldier: that is, the food must be proportionate to the work. The other conditions of dieting as worked out scientifically are either applicable to an army in an inconsiderable degree or are wholly inapplicable.

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* Froude, History of England, Vol. IV. pages 285 and 286.

† Parkes, "Causes of sickness in English Wars," Journal United Service Institution Vol VI.

In consequence of this, the food of soldiers can be viewed only within very confined limits. To change their food according to their respective growths, temperaments or the amount of work each may individually do is not possible, and too, would be superfluous because the conditions for the greater number are the same.

The need to alter a soldiers food, according to climate is a much more serious question. In practice the fulfilment of this condition is met by insuperable difficulties. Particularly is this so in the case of the British Soldier, who serves in all parts of the world. The climate of Aldershot differs from that of Gibraltar and the Mediterranean stations: while the climate of these again differs from India, the Straits settlements, the Cape or the West Indies. Practically the greater number of soldiers in all climates receive in our own army a similar kind of food.

In this Essay, the writer proposes to discuss the food of the British Soldier in relation to his work and health under the following condition of service. (1) at Home: (2) when on Boardship: (3) in the Colonies: (4) in India: (5) in time of War: with a special reference to the questions of preventing Scurvy, and of using concentrated and preserved foods.

1. THE HOME RATION.—The usual daily food of the soldier when at home is given in the following table:—

	Gross Weight.	Water Free.	Albuminates.	Fats.	Carbo Hydrates.	Salts.	Nitrogen.	Carbon.	Potential Energy.
	oz.	oz	oz	oz.	oz	oz.	grains	grains	f. tons
Meat with bone	12·	2 4	1 44	·81	...	·15	99	587	520
Bread	24·	14·4	1 92	·36	11 81	·31	132	2,784	2,238
Potatoes ...	16·	3 86	·32	02	3·36	·16	22 6	720	516
Vegetables ...	8·	7	·14	·04	·46	·06	9 6	136	90
Milk	3·25	·43	·13	·12	·16	·02	8 8	107	90
Sugar	1·33	1 29	...	...	1·29	...	...	277	160
Salt	·25	·25	...	..	...	25	...	...	...
Tea or	·16	...	...	...	...	...	...	...	...
Coffee	·33	...	...	...	...	...	...	...	...
	64 99	23 33	3·95	1 35	17·08	·95	272·	4,611	3,614

Of this 1 lb of Bread and ¾ lb. of meat are given free by Government. The remainder is technically known as the "Grocery" ration and is supplied to each man daily through the regimental canteen for a daily stoppage of 3*d.* (average.) In this diet the Nitrogen is to the Carbon as 1 is to 16. Passing to the first condition which the food of a soldier must fulfil, that of cheapness, we find that this condition is always at variance with the others. It may be observed that with the large budgets of modern armies almost 25% of the expenditure is set apart for the feeding of the troops. Every apparently inconsiderable addition of 1*d.* per day per man will in an army of 200,000 men amount in a year to an increase in the expenditure of about £300,000. In regard to the second condition, the absence of Scurvy and allied affections in the army at home indicates that the ration in the main fulfils the requirements in that respect. Whether this ration fulfils the third condition, it is necessary to examine it in connection with what is expected from the soldier in the way of work, and to see whether the constituents are in sufficient quantity or not, and whether their form and proportions are such as the circumstances of the case demand.

To do this, it is needful to enquire what is required from the soldier. His duties cannot be said to be hard. They consist of parades, drills, guards and picquets, to which must be added various kinds of fatigue duty. Of course supplementary to these he is called upon at times to do marches and field manœuvres at varying degrees of velocity. By means of Haughton's formula, the work done on an ordinary march is easily calculated as foot tons.* What external work a soldiers usual duties amount to, it is not easy to calculate. Owing to the peculiar constrained attitude incidental to drill, there is every reason to think that four hours drill is in regard to quality of work in many cases equivalent to ten hours in the fields.† Both from experiences as a volunteer private, and when going through the class of instruction at the medical staff corps depôt, the writer knows the fatigue attending three hours drill a day to be very severe. There can be very little doubt, every soldier should be prepared for not less than 300 foot tons of work a day. Although at times he may be called upon to do less than this, it is fully compensated by the extra strain made upon him at others. It has already been stated that 300 foot tons of work generally is accepted as the numerical expression of a fair days work. The amount and nature of the diet suitable for it has been calculated to be not less than 4·6 ounces of albuminates, 3 ounces of Fats, 14·3 ounces of Carbohydrtes, and 1·1 ounce of salts or a total of 23 ounces of water free food daily. Compared with this standard diet, the home ration offers 3·95 oz of Albuminates, 1·35 oz. of fats, 17 08 oz. of Carbohydrates, and ·95 oz. of Salts. That is, a deficiency of about 14 per cent. in the Albuminates, of more than 55 per cent in the fats, and quite 15 per cent in the salts, whilst the Carbohydrater are 19 per cent. in excess. As regards its Potential Energy it is short of the standard diet by 288 foot tons. The discrepancy is still more marked if one enquire into the source of the energy. Thus in the standard diet 20 per cent. of the energy is due to the albuminates, 29 per cent. to the fats, and 51 per cent. to the carbohydrates. Whereas in the soldiers ration, 19 per cent. is due to the albuminates, only 14 per cent to the fats, and as much as 67 per cent. to the carbohydrates- (See Appendix II.) Although the ration in the matter of total water-free food weighs a trifle more than the standard diet, yet it cannot be said to be a satisfactory ration. The Carbohydrates are in undoubted excess, while the fats are deficient. In fact we may say—" that in the soldiers diet there are the following fundamental errors. The albuminates are deficient, the fats are very deficient, the starches are in excess, the salts are rather deficient." * For an ordinary soldier who has done growing, and who has not more than an hour or so of parade a day, with perhaps one guard in five or six days, probably the present ration may suffice, but it must be remembered that the army now at home consists mainly of recruits. These recruits are all young men† who are at instruction drill the greater portion of the day, doing a good and hard days work, requiring a full standard diet to meet it. Nearly all of them are nothing more than growing lads, and at a time of life when the body needs special sustenance for its development. A few years back when in medical charge of a large recruiting depôt in the north of England, the writer calculated by careful measurement of the ground traversed, and by careful weighing of the individual, the actual external work done by two recruits in the course of three successive days. One man belonging to the infantry, and the other to a field battery. The mean of the three days was 281 foot tons of work on the part of the foot soldier, and 307 foot tons done by the artillery man. At the same depôt the writer was in the habit of inquiring from the lads who there constituted quite three-fourths of the garrison, if they got as much food in barracks as at home. The universal reply was naturally that they obtain a good deal more, considering that the majority of them do not enlist except when hard pushed for work and bread. To another query, whether they got enough and if they could eat more, they nearly always said the ration was satisfactory, but that they usually had to buy more. This necessity of buying more, is the true index as to sufficiency or insufficiency of the ration. The young soldier has never too much money, and the writer knows from persistent enquiries that all the spare cash he has goes to his stomach. With the exception of a very few, the recruits do not drink: they do not spend their money on beer, it goes entirely in eatables. Such at least is the writers experience, after considerable attention to the habits and life of yonng soldiers at home. There is often reason to think that a young soldier gets into the habit of going to the canteen for drink, not so much that he is actually thirsty but rather to check the cravings of an empty stomach by filling it with liquor. In former days when more old soldiers were in the ranks a certain number of them who had long been accustomed to take spirits,

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* See a table in a foot note of Parkes Hygiene, page 410.

† See Colonel Clive's remarks on lecture by Colonel Tulloch on "Soldier's Food," Journal United Service Institution Vol xxviii. page 901.

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* De Chaumont, Sanitary Record, February 5th 1876, also "Military Hygiene" in the Journal United Service Institution, Vol. xiv. page 349

† The A M. D. report for 1883 gives the average age of recruits to be 19·78 years.

and who had thereby impaired their digestive organs, rarely ate their whole ration: the result was their share was given to the younger and hungrier ones. Owing to the changed conditions of the present day, and to the very large proportion of young men in the ranks now, such practice rarely obtains That the soldier largely supplements his ration by means of private purchases is well known: but he does this somewhat irregularly. For a few days following pay day he adds largely to his fare, while on the remaining days he depends almost solely upon his ration. It is somewhat difficult to obtain any very precise details as to the actual articles the men consume as supplementary purchases. By means of very careful enquiries through the canteen and pay sergeants, the writer obtained the following details as to the actual messing of four men in an English garrison during a certain week, commencing from a certain pay day. For the first three days after the receipt of pay, the daily food of each man averaged, meat 12 oz. (with bone,) bread 20 oz., potatoes 16 oz., milk 3·25 oz. bacon 1·5 oz., eggs 1, butter 1 oz., cheese ·5 oz., sugar 1 oz., salt ·25 oz., tea ·16 oz. Of these it is obvious, the bacon, the eggs, cheese and butter were additions to the ration supplied by private purchase. Their fare for those three days must be deemed satisfactory, bnt at the same time precarious. After the third day, a remarkable falling off took place, presumably due to want of funds: as for the four remaining days of the week their supplementary purchases only averaged one smoked herring, or 1 ounce of bacon, or 1 ounce of butter and $\frac{1}{3}$ ounce of cheese. The consumption of bread for the week averaged daily 4 oz. less than that usually credited to the men. Expressed numerically in dietetic terms the whole weeks messing of these four soldiers (indiscriminately selected) averaged daily for each man, albuminates 3·9 ounces, fats 2·4 oz., carbohydrates 16·7 oz. and salts ·97 oz. Containing 270 grains of Nitrogen and 4,880 grains of Carbon. the two being as 1 is to 17. The Potential energy was equal to 3,900 foot tons. Some few men systematically purchase extra meat, with butter and bread for supper; but the larger number are very careless, and content with a little extra in the way of butter and cheese. The writer's experience leads him to think that taking one day with another even including purchases in the canteen and elsewhere, the soldiers daily fare at home never exceeds 4 oz. of albuminates, 2 oz. of fats, 17 oz. of carbohydrates and 1 oz. of salts. This represents 276 grains of Nitrogen, 4,700 grains of Carbon, and 3,863 foot tons of energy. It is instructive to note how even this spontaneously obtained diet falls short of what scientific evidence has shewn to be the needs of a man under apparently identical circumstances. Though it must be admitted it approaches much nearer the standard than the issue arranged and given by Government.

The changes which seen necessary in the soldiers ration at home to render it absolutely sufficient for perfect health are the following. The Nitrogen to be increased about one-fifth, the fats to be about doubled, the salts to be slightly increased, and the carbohydrates to be slightly lessened.

A reference to Appendix III. shows that curiously enough the same errors which effect the English ration, pervade the diets of other

European armies: namely too little nitrogen, an absurdly small amount of fats, with an excess of carbohydrates. It may be objected by some that the present actual feeding of the soldier at home is not insufficient as shewn by the foregoing facts: but on the other hand it must not be forgotten that the figures just quoted are a maximum estimate, and even they are only obtained by including the soldiers private purchases in his total daily aliment. This item is notoriously uncertain and precarious. Preliminary to discussing what improvements can be made in the existing ration, it is necessary to inquire whether the present system of the issue of only a partially free ration is advantageous. The feeling of all experienced commanding officers is against it, as being productive of discontent and increased clerical work in the regimental offices: while amongst the men themselves the dissatisfaction at having to pay for nearly half their food is immense.* It is true that the issue of a free ration altogether would mean an appreciable addition to the estimates, but there can be little doubt but that it would be largely compensated by greater popularity of the service, increased health, lessened desertions and diminished crime. It is to be feared however that an absolutely free ration, sufficient to meet the requirements of the men is not possible, owing to financial reasons. We have seen that even supplemented by private purchases the present issue is barely enough for the young and immature men who fill the home battalions. In addition to this, the feeding is most irregular: certainly for a few days immediately following pay day the men get enough by buying extras, but even this is not so with all. If a man once gets into debt, loses part of his kit, or is of irregular habits he has not enough spare money to supplement his ration. He depends solely upon the Government issue and we have seen that to be notoriously deficient in certain respects. Not only is the present ration theoretically deficient, but practically allows for only one good meal with two scanty ones in the day. Without supplementary extras (privately purchased) the soldiers breakfast consists merely of tea and dry bread: his dinner of meat, bread, potatoes and vegetables: while the evening meal is again tea and dry bread. Unless he buys something himself, the soldier has nothing available from his ration but tea and bread, to take between dinner at 1 P. M. on one day until breakfast at 8 the following morning.

It is true the attention of commanding officers has been officially directed to the importance of encouraging the men to take an evening meal, and also a cup of tea or coffee in the early morning. Partly from a disregard for their own welfare, and partly from an inability to incur the cost, these two meals (specially the evening one) are most irregularly taken by the men. It is no argument to compare the feeding of the soldier at the present day, with what he received fifty years ago. So too the oft quoted saying "the soldier should accustom himself to every thing" is but the expression in words of an utter ignorance of the laws governing the human organism. The absence of any definite and regular meal in the evening is undoubtedly a source of great mischief: it leads to a craving for stimulants and indirectly to crime and disease. The canteen is the main resort of the men in the evening: that is the hour most in accordance with the men's leisure, but not the time when they are most capable of withstanding the effects of the beer they usually consume. The experience of us all teaches that with empty stomachs we succumb much more readily to the effects of alcohol. be it as beer, wine or spirits Now what is the condition of the soldier? If a hundred men be taken from a canteen in the evening, at least eighty of them will be found to have been without a good meal since the midday, and not likely to get another till the morrow.

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* See remarks by Colonel Knollys on this subject, Journal United Service Institution Vol. xxviii. page 900.

Is it a wonder then, that men get drunk on apparently small quantities of beer? It has been suggested, to meet this defect, that Government should issue a compulsory evening meal in return for an increased stoppage. Any such stoppage would render the service still more unpopular than it is now, and on that ground alone this proposal would be unadvisable. It has already been remarked that the present stoppage for "Groceries" is a source of much discontent among the men. If any such meal be introduced it would be advisable to make it a free issue. At the same time it must be remembered that the introduction of an evening meal would only partially remedy the present defects: it would in no way help the soldier to get a better breakfast than he does now, and that is a point nearly as important as an evening meal. For financial reasons alone, it is tolerably certain that no Government would sanction the abolition of the "grocery stoppage," or the issue of a sufficient and totally free ration: therefore the question resolves itself into this, how can the greatest improvement be made for the least expenditure. In the writer's opinion, the best way of meeting the deficiencies is, in the first place to increase the nutritive value of the ration, and in the second, to change the meal hours; thereby distributing it over the day in such a manner as to obtain from the diet its greatest effects. Following the lines laid down by Professor DeChaumont* the ration itself could be efficiently and economically improved by increasing the meat to 1 lb. gross, and giving cheese 1 oz. and butter 1 oz. daily. At the same time to limit the carbohydrates, the potatoes might be limited to 12 oz. and the bread to 20 oz. In regard to the meal hours, the breakfast might continue to be taken at 8 as now: but with an improved ration as proposed, this meal might then consist of half the meat issue with tea and bread and butter, instead of merely tea and dry bread as at present. The midday meal could be taken at noon, and consist of bread, cheese, butter and beer, or even tea and extras privately purchased. The remainder of the ration would then be left for dinner at five to six o'clock, and consist of meat, bread, potatoes and vegetables, etc., etc. Such a routine would ensure an evening meal to the men, after the days work was over, independent of their own pockets and at little extra cost to Government: it would check the disposition to drink in the canteen in the evening, it would better prepare men on guard for the fatigues of night duty;

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* "The Soldiers Ration" Sanitary Record, February 5th 1876.

and at the same time by engendering the habit of a late and good meal when the day's work is finished, would accustom the men and prepare them for what actually occurs in the field. When fighting is going on, and marches have to be done against time and the enemy, little leisure remains for midday meals It is a case of one in the morning and possibly nothing more till night fall. More than this, it would assimilate the men's mode of living to that of their officers. The officers have insensibly, by the sheer force of fitness of things, gravitated to the custom of taking one good meal in the morning and another in the evening. What is to prevent the adoption by the men of that which has been found to suit his officer best? Possibly many men of experience may say such a system as thus sketched out is absurd: and be inclined to use the words of the late General Gordon to Sir Arthur Herbert "It is ridiculous to pamper up the army as you do, you could" "never take the field." To such, one may reply, it is not absurd but rather common sense, if given a limited allowance of food, to so distribute it over the day as to obtain from it its maximum benefits.

Although the nutritive value of different foods and the quantity and efficacy of different alimentary substances are of the first importance, yet monotony of diet must be avoided: the "toujours perdrix" contains an important dietary truth. If the eye be fixed for long on any one colour, it soon ceases to be charmed by it, and in the same way uniformity of diet soon produces a loss of relish, and in time an absolute distate. Constant variety of food, and in the preparation of the same, is an important factor in our calculations, and should not be overlooked. To this end, in the issuing of a dietary to the soldier at home or elsewhere, he must not always be given the same meat. One day a week the writer would substitute Chicago or tinned meat (12 oz.) in lieu of 1 lb. of fresh: together with a tin of erbswurst or even a concentrated soup. On another day in place of the fresh meat, 12 oz. of either sweetened or plain Pemmican might be given. On a third day ½ lb. of salt cod fish* with ½lb. of fresh meat.

This arrangement besides introducing variety into his daily fare, would familiarize the soldier with the class of articles he would have to cook and eat on service. This want of accustoming the men to preserved foods in Peace time, in anticipation of the needs of war is a serious defect in our present system. It is true they are less palatable and agreeable than the fresh articles, but it is not proposed to substitute them entirely for the latter, but rather by systematic issues to teach the soldier, that on them he can thrive, and when the time comes for depending on these articles, (or their like) solely, his unfamiliarity with them may not be an obstacle in the way of his turning them to the best account. Much more could be done to give variety to and extras for the men's ration, if greater attention were shewn by officers commanding regiments to the question of managing the canteen funds and extra messing money. Colonel Tulloch, in a very sensible lecture on "Soldiers' Food,"† deals with this matter and shows how much improvement can be made in this direction at really no increased outlay on the part of Government. The writer would here suggest that greater facilities for buying canned and tinned foods be given to the men, than they at present enjoy. By the encouragement of canteens etc., something has been done in this direction but its principle as conveyed in general orders and departmental circulars is very different to the actual working of the scheme. In some regiments the variety and cheapness of articles of this kind obtainable is remarkable: but such cases are few. There should be at each station under the direct control of the commissariat, a store where every kind of tinned food, canned and dried fruits could be bought by the men at cost price. This is the system carried out in the United States, where all commissary officers are authorized and compelled to keep up these stores, selling to each enlisted man such articles at the lowest cost prices. Such a system would be a vast improvement on our method of retailing by the regimental canteens, which is on too small a scale to permit of much cheapness The following table shows the value of the additions proposed to be made to the present ration at home.

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* Codfish is issued as part of the ration in both French and Spanish armies. Its nutritive value is not high, but useful as a variation.

† Journal of United Service Institution, London, Vol, xxviii,.

Additions.	Gross Weight.	Water Free	Albuminates.	Fats.	Carbohydrates	Salts.	Nitrogen.	Carbon.	Potential Energy.
	oz.	oz	oz.	oz.	oz	oz	grains	grains	f. tons
Meat with Bone,	4·	·8	·48	·27	..	·05	33·	195	174
Cheese	1·	·64	·34	·24	...	·16	23 2	153	168
Butter	1·	·9	003	91	...	·03	·2	312	342
Total ...	6	2·34	·823	1 42	...	·24	56·4	660	684

The deductions proposed would have the following value.

Deductions.	Gross. Weight.	Water Free	Albuminate.	Salts.	Carbohydrate.	Salts.	Nitrogen.	Carbon.	Potential Energy.
	oz.	oz.	oz.	oz.	oz.	oz.	grains	grains	f. tons
Bread	4·	2 4	·32	·06	1·96	·05	22·	464	373
Potatoes ...	4·	·96	·08	·005	·84	·04	5·5	180	129
Total ...	8	3 36	·4	·065	2·8	·09	27 5	644	502

The net changes proposed in the ration would be as follows.

Net changes.	Gross Weight.	Water Free.	Albuminates	Fats.	Carbohydrates.	Salts.	Nitrogen.	Carbon.	Potential Energy.
	oz.	oz.	oz.	oz.	oz.	oz.	grains	grains	f. tons
Existing Ration.	64·99	23·33	3·95	1·35	1.708	·95	272	4611	3614
Proposed additions	6·	2·34	·823	1·42	...	·24	56·4	660	684
Total ..	70·99	25·67	4·773	2·77	17·08	1·19	328·4	5271	4298
Proposed deductions..........	8·	3·36	·4	·065	2·8	·09	27·5	644	502
Net Total ...	62·99	22·31	4·373	2·705	14·28	1·1	300·9	4627	3796

The proposed diet as amended is given in detail in Appendix IV. Viewed financially the proposed changes indicate the following figures. The additions suggested would themselves cost about 3*d.* a day per man: presuming the home army to be 100,000 men, this would mean £456,000 added to the estimates. From this sum may be taken the value of the proposed deductions, which may be calculated as about 1½*d.* per man each day. This for 100,000 men means a deduction of £230,000, leaving the net cost of the improvements to be about £226,000 per annum additional to the present cost of the ration.

Such are the facts concerning the relation between the Food and Work of the soldier at home: whether action be taken for their adjustment rests with the administration.

2. THE SOLDIER'S FOOD AND WORK ON BOARD-SHIP.—The ration issued to the men when on ship-board is given in detail in Appendix V. It consists of a daily average of albuminates 4·95 oz., fats 1·51 oz., carbohydrates 12·85 oz., and salts 1·94 oz. It contains 341 grains of Nitrogen, and 4,190 grains of carbon. The potential energy is equal to 3,345 foot tons. The amount of total water free food being 21·25 oz. Fresh meat and fresh vegetables are given on the 1st and 2nd days of the voyage, if the weather permits of their being kept sweet. To troops leaving England, the issue of lime juice is not compulsory, but depends upon the recommendation of the medical officer. To troops returning from India and the Colonies, for the first 21 days each man receives ½ oz. of lime juice, with ½ oz. of sugar daily: after that day the issue is doubled. In these times long voyages are the exception. The average duration of troopship voyages, is not more than three weeks. The ration given to the men must be considered liberal in proportion to the work demanded of them. The amount of physical labour done by the men or boardship is practically *nil*: and as a rule most gain weight on a voyage. They have a great objection to the soup or bouilli days.

The nitrogenous elements of the ration are much in excess relatively: while the fats are markedly deficient. The men complain much of the morning and evening meals, when they receive nothing but dry bread and milkless tea. The beer is issued with the dinners.

Considerable improvement would be made in the diet, if the meat issue were slightly reduced, say to 10 oz., and 1 oz. of potted butter with two ounces of condensed milk (sweetened) issued as part of the breakfast and tea. The nutritive value of the ration would then stand somewhat as follows. Albuminates 4·5 oz., fats 2·5 oz., carbohydrates 14 oz., and salts 1·8 oz., Nitrogen would be to Carbon as 1 is to 14. The Potential energy would be 3,820 foot tons. Statistical returns show the prevalence of no special diseases among troops at sea, attributable to diet; and from this we may conclude that the dietary is in the main satisfactory and equal to the wants of the men.

3. THE RATION IN THE COLONIES.—By the term Colonies it is intended to include all foreign stations excepting India. The diet issue in this latter country presenting certain features peculiar to itself, will be considered separately. In the early part of the present century there does not appear to have been any fixed ration for troops in the colonies, and the irregularities which prevailed in the issue of provisions at the conclusion of the Peninsular War in 1815 seem to have given rise to the warrant of July 12th 1816, which limited the ration in the Colonies (except Jamaica) to 1 lb. of meat, either fresh or salt, 1 lb. of bread or biscuit, 1 pint of wine or $\frac{1}{3}$ pint of spirits. From 1818 to 1826 some small changes were made in this ration at the cape and on the Natal frontier, the meat allowance being increased to $1\frac{1}{2}$ lb. with 2 oz. of flour. Subsequently the warrant of 14th July 1827 altered the foreign ration to bread or biscuit 1 lb. fresh or salt meat 1 lb. $\frac{3}{7}$ of a quart of wine, or $\frac{1}{7}$ of a quart of rum. Between 1830 and 1850 the issue known as the "tropical ration" was promulgated as follows. Bread 1 lb. or biscuit $\frac{3}{4}$ lb. or flour $14\frac{2}{7}$ oz.; beef 1 lb., (either fresh or salt) or salt pork 12 oz. rice 4 oz. or peas $\frac{1}{2}$ a pint: sugar $1\frac{2}{7}$ oz., and cocoa $\frac{5}{7}$ oz. This again was altered by the warrant of December 24th 1850 which restricted the ration of troops at all stations to bread 1 lb., or biscuit $\frac{3}{4}$ lb., and meat 1 lb. (either fresh or salt.) This ration seems to have prevailed to the present day, excepting at Hong Kong, where two ounces of rice, $1\frac{1}{3}$ oz. of sugar, and $\frac{1}{4}$ oz. of tea were specially allowed. The present colonial ration is similar to the home, excepting that the issue of meat is 1 lb. in place of 12 oz.

The "Grocery stoppage" and the articles given in return for it are identical. As such, this ration offers a daily nourishment of albuminates 4·43 oz., fats 1·62 oz., carbohydrates 17·08 oz., salts 1 oz. It contains 305 grains of Nitrogen and 4,806 grains of Carbon: while its Potential energy is equal to 3,788 foot tons. Although the Nitrogen approaches nearer the standard than in the home ration, yet the same deficiency of fats, and excess of carbohydrates is apparent. No special diseases among the colonial garrisons can be attributed to these defects. Proposals as to its amelioration are almost identical with those already given in regard to the home ration. The present allowance of meat should remain unchanged : the bread and potatoes might each be reduced by 4 oz. while cheese 1 oz. and butter 1 oz. might be added daily. The writer, at the same time would alter the hour of dinner to 5 or 6 o'clock, on the same principles as discussed when speaking of the home issue. As the proposed additions (except that there is no extra meat suggested) and the proposed deductions to and from the Colonial ration are similar in value to those made in the home allowance, in order to avoid repetition tables of details may be omitted (reference can be made to pages 39-40) The net result is exactly the same as the ration proposed for use at home : (see Appendix IV.) and is conveniently demonstrated in the following table :—

	Gross Weight.	Water Free.	Albuminates.	Salts.	Carbohydrates.	Salts.	Nitrogen.	Carbon.	Potential Energy.
	oz.	oz.	oz.	oz.	oz.	oz.	grains	grains	f. tons
Existing Colonial Ration	68·99	24·13	4·43	1·62	17·08	1·	305·	4806	3788
Proposed deductions	2·	1·54	·343	1·15	...	·19	23·4	465	510
Total ..	70·99	25·67	4·773	2·77	17·08	1·19	328·4	5271	4298
Proposed deductions	8·	3·36	·4	·065	2·8	·09	27·5	644	502
Net Total ..	62·99	22·31	4·373	2·705	14·28	1·1	300·9	4627	3796

As the additions and deductions proposed would each respectively cost about 1½*d.* per man daily it is obvious that from a financial point of view these suggested changes in the Colonial ration will entail no increase to the Budget estimates. From the foregoing it will be apparent that the writer proposes the issue of one and the same diet to troops whether at home or in the Colonies. Its composition and value is detailed in Appendix IV.

4. The Ration in India.—Owing to some inherent peculiarities of its own, and to the fact that more than half of the British army abroad is located in India, this ration merits special attention and analysis. At the end of the last century (1760) the daily allowance of food per man in India, was beef or mutton 1½ lb., biscuits 1 lb. or rice 1½ lb. with arrack 4 drams. The present issue seems to date from 1861, and is

evidently formulated on the lines of the old "tropical ration." Its constitution and nutritive value is shewn in the following table :—

	Gross Weight.	Water Free.	Albuminates.	Fats.	Carbohydrates.	Salts.	Nitrogen.	Carbon.	Potential Energy.
	oz.	oz·	oz.	oz.	oz·	oz·	grains	grains	f. tons
Meat with Bone	16·	3·2	1·92	1·08	...	·2	132.	782	694
Bread	16·	9·6	1·29	·24	7·84	·2	88·	1856	1492
Potatoes ...	16·	3·86	·32	·02	3·36	·16	22·5	720	516
Rice	4·	3·6	·2	·032	3·38	·032	14	700	511
Sugar	2·5	2·42	...	...	2·41	·012	...	445	314
Tea	·71	·7	...	...	...	...	...	...	...
Salt	·66	·66	...	...	...	·66	...	...	...
Total ...	55·86	24·04	3·72	1·372	16·99	1·264	256·5	4503	3527

In addition to the foregoing each man receives 4 lbs. of firewood. Of these articles the bread, meat and wood are a free issue : the remainder is supplied by the commissariat for a daily stoppage of 9 pies (about one and a half rupees per month.) Besides this Government allows a daily issue, in two portions, of one dram (about 4 oz.) of rum on payment. In former days this spirit issue was a free allowance : enquiries show that only about 12 per cent. of the men take advantage of the spirit issue. As regards the first of the three conditions essential to a soldiers food, namely cheapness, the same remarks made concerning the home ration apply equally to this. Before determining whether the ration fulfils the second condition, and is efficient in warding off disease, it is necessary to note what relation disease bears to food in India. For practical purposes diseases dependent upon food may be classed under one of the following heads, 1st those due to impurities and adulterations of the various articles. 2nd those due to an excess of diet. 3rd those due to deficiency. Of the first group there is no evidence to show that disease occurs among the men from these causes. In fact taking all things into consideration the average quality of the ration is good. As to the second group, the effects of excess are not uniform.

In the opinion of the writer very little disease arises among soldiers from actual excess of diet.

Though the class of diseases usually attributed to dietetic excess are by no means uncommon in the Indian army, yet there is reason to think that such are due rather to errors in drinking than to errors in eating. Again too, the influence which malaria and other climatic effects have in bringing on hepatic and other internal congestions is difficult to apportion. Harley[*] attributes liver troubles mainly to gluttony and intemperance. Surgeon-General Moore[†] Blane and Sir J. Fayrer[‡] are disposed to exonerate the excess in food and drink, and to blame chiefly the malarial fevers which predispose so much to visceral congestions, though doubtless aggravated by injudicious eating and drinking. It is a common thing to hear of the gluttony and high feeding of the soldier in India: but does one hear of officers eating too much? Probably the soldier is no more of a glutton than his officer, and certainly the food of the one is far less tempting to excess than that of the other. Taking the third group of diseases, namely those due to deficiency, we find fallacies and difficulties again in the way of any very exact determinations as to how far their occurrence may be due to enervating effects of a tropical climate or to alimentary defects. Scurvy is said to have increased in India, the admission rate being 2·3 per 1000: this increase is apparent only. The disease is now more commonly sought for, and more easily recognized. The experience of the writer has demonstrated the existence of a general scorbutic taint among troops in the plains of India, when supplied with the regulation ration in the hot season. This taint is an enervating influence which saps efficiency without appearing as Scurvy on the medical registers. He has therefore no hesitation in saying that the Indian ration is deficient in certain elements, particularly vegetables, and such articles which are capable of combating and preventing the tendency to Scurvy.

Before examining the third essential, whether the food is adequate to the work demanded, a distinction must be made between the food actually supplied as a ration, and that which the men really consume. In India food is much cheaper than at home; in consequence of this, the men are in the habit of adding largely to their rations by private purchases. Taking the ration supplied to the men in India, one finds in it similar faults as exist in the ration at home. Compared with the standard diet, there is a deficiency in both fats and albuminates, while the carbohydrates are in excess. The total Potential Energy available is 375 foot tons less than the standard, and what there is is not obtained in proper ratio from the various constituents.

Thus instead of 20 per cent. being drawn from the albuminates as in the standard diet, only 18 per cent. is obtained. From the fats, only 14 per cent. is obtained instead of 27 per cent. while the carbohydrates furnish 17 per cent. more than they should do. The exact amount of work done daily by each soldier in India is equally difficult to precisely determine as at home. At certain seasons particularly in the hot weather, the actual amount of work done undoubtedly falls short of the European standard. But this diminished labour index is fallacious inasmuch an almost unknown quantity in the way of demand on bodily vigor is present in the peculiarities of climate, and the enervating influences always at work. On the other hand, in the cooler season, the soldier does undoubtedly as much work as when at home. In fact taking the practice of later years into consideration, and the constant occurrences of camps of exercise, marches etc. etc., the soldier is certainly called upon for six months in the year, to furnish the full quantum of work credited to ordinary labour, namely 300 foot tons. Though from climatic and physical causes the hot weather existence is one of apparent indolence, and of which the words of Horace are peculiarly applicable—

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[*] Harley, "Diseases of the Liver" [†] Moore, *Lancet*, October 31st 1885,
[‡] Fayrer, "Tropical Diseases."

" Noctes vigilabat ad ipsum"
" Mane diem totum stertebat, nil fuit unquam"
" Sic impar Siler."

Yet personal experience proves that the calls upon the constitution in a tropical climate, during the warmer months, even with a minimum amount of exercise are not much short, if at all, of an ordinary days work in Europe. It must be remembered that the soldier does his one or two drills still a day, with his guards and fatigues. Taking the year through there is little doubt that the average daily work of the soldier is quite 300 foot tons, and in the case of the artillery or cavalry perhaps more: it being such he needs the full diet to meet that demand. In India from the cheapness of food, and from the fact that he has cooks and coolies to wait upon him, the soldier in daily life fares much more sumptuously than when in England. Taking the actual messing of six men for a week in India, the writer found that each man was consuming on an average the following articles daily in addition to his regular ration. meat 2 oz., (usually kidneys, chicken or tinned meats) bread 2 oz., flour 3 oz. (in exchange for his rice) eggs 2, butter 1½ oz. and milk 3 oz. These articles purchased by the men, and added to the ration, give a total value to the whole day's aliment of albuminates 4 61 ounces, fats 3·032 ounces, carbohydrates 17·54 ounces, and salts 1·36 oz. The nitrogen amounts to 317 grains and the carbon to 5,395 grains. The proportion between the two being as 1 is to 16, The Potential Energy equals 4,360 foot tons. This approaches very closely to the standard diet, and is more or less consumed by most of the men, though perhaps not by all. Some either from lack of money, or personal taste do not thus largely supplement their ration: but even these men usually add to their daily allowance some butter and milk with perhaps an egg.

Such being the case it would seem that the majority of men get one day with another, by adding to the ration articles privately purchased, a standard diet suitable for men in ordinary work. Notwithstanding this there is reason to think that there is a deficiency in the food, particularly in the hot seasons. This deficiency is the paucity of vegetables, and what there are, are wanting in antiscorbutic properties, Potatoes are more or less scarce: onions, pumpkins, brinjals and occasionally beans are the only vegetables available. These being of country varieties are little relished by the men. The question of vegetable gardens in Indian cantonments for the use of troops needs re-opening. It is true, barrack gardens exist, and for the cultivation of which the men are stimulated in a half hearted sort of way by the offer of prizes. The gardens them selves are much too limited in area to meet the requirements of the men: further, irrigation is imperfect and without irrigation nothing will grow in India. What is needed is the establishment of *station* instead of regimental and battery gardens. Such should be devoted exclusively to vegetables, and under the control of a committee, with native coolies as a permanent staff. Each regiment or battery should contribute monthly to the expenses while the Central Government could allow an annual subsidy.

The men could and should work in these gardens themselves, and in turn receive allotments. By some such system the gardens would be independent of troops leaving stations on relief (by virtue of the permanent native staff) and at the same time return products all through the year. To meet the needs of the summer, when vegetables are scarce, they should be grown in sufficiently large quantities during the cold weather, and stored as at home we do potatoes, onions, tomatoes and turnips. The officer class should not draw their vegetables from these gardens, unless sufficiently productive, and then only when the needs of the men have been adequately provided for. As matters now are, it is not at all unusual for men in barracks in the plains during a hot season, to never taste any thing but potatoes in the way of vegetables ; and even at times not to receive them*

The remarks made concerning the hours of meals at home have tenfold more force when applied to the circumstances of India. No more fallacious custom ever existed than the eating by the European soldier of his heaviest meal in the hottest time of the day. The writer would propose no meal at all in the midday, or if one be taken at that time, let it be of the lightest and simplest kind. Let the men have an early cup of coffee on rising, and the ordinary breakfast of half the meat ration, bread butter and tea between 8 and 9 o'clock. Tea with bread and butter could be taken say at 1 P. M. while the dinner of meat, bread and vegetables should not be consumed till quite 5 to 6 o'clock. Where this rule introduced and enforced, undoubted benefit would accrue to the men's health : the tendency to drink, and the liability to malarial influences so prevalent at sundown, particularly in those with empty stomachs, would in great measure disappear. It is true that now, owing to the excellent "coffee shops" provided in regiments and batteries, great facilities are given to the men for obtaining an evening meal at a nominal price. This arrangement is better than no meal at all, but what is needed is a *regular meal* to be taken at a definite hour, and by one and all, and at the same time of unmistakeable wholesomeness, not a haphazard meal taken by some and not by others, and quite dependent upon the individual soldier's financial state. Such can only be obtained by changing the present dinner hour : which for other reasons we have seen would be beneficial. The present canteens it would be unadvisable to change. They are open from 11-45 A. M. to 12-30 P. M., and from 6 to 8-45 P. M. in the evening. The present system known as the "unlimited" was introduced in 1879 and practically allows a man to obtain malt liquor in such quantities as may be convenient to himself, duty permitting and he being sober. Statistics obtained from temperance sources show that the average consumption of beer per man per day, does not exceed a quart. During the hot season, beer might with advantage be forbidden to be sold between the the hours of 12 and 4, and the sale of spirits stopped altogether. But such rules should not be enforced without mature consideration : one great objection to any such proposals being that, the soldiers desire for spirits and malt liquor increases with the difficulty of obtaining them : and any restrictions on the sale of liquor in the canteens would only drive the men to consume bazaar drinks. The late Dr. N. Chevers and others have suggested a decrease of the animal and an increase of the vegetable issue to European troops in India. While agreeing with the proposal to increase the vegetable in the opinion of the writer the quality of the meat ration is not sufficiently good to justify any diminution in the quantity of it. Indeed the practice pursued by the men of adding to the animal portion of the ration may be taken as evidence that it is not in excess. It is curious to see how the very articles which the men buy themselves to supplement the ration given them, are precisely of that kind which scientific analysis has shewn the diet to be deficient in : that is a small quantity of albuminates, and a larger amount of fats. The meat served out to the men, is as a rule of inferior quality, aplastic, lean and innutritious to a great extent. The animals are underfed : excepting just after the rains grass is extremely scarce, and the cattle depend mainly on the Government ration. This for oxen is 14 lbs. of boosa (chopped straw) daily, and no gram, for sheep it is 8 oz. of gram and 2 lbs. of boosa.

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* Commissary General's of Bengal Circular 2303 of 1871 forbids potatoes being issued at all, if they exceed 12 rupees per maund in cost, Not unfrequent in the hot season. This rule does not apply to Aden and the Andaman Islands.

To remedy the present defects of the Indian ration, the first necssity is to secure an adequate supply of vegetables. to this end an issue of 8 oz. of cabbage or its equivalent of green vegetables (other than potato) should be compulsory, in addition to the potato issue which might then be limited to 12 oz.

The next need is to change the hour of dinner for the men from midday to 5 or 6 o'clock. We have seen that owing to the cheapness of food, the men by means of private purchases, in one way or another as a rule, obtain a diet equal nearly to the standard. Such being the case it is open to doubt whether many alterations are required in the ration beyond those already mentioned.

If any be made they should be on these lines.

The present rice issue might be abolished : for the men very rarely consume it, a frequent custom being to barter it in exchange for eggs or butter and milk. The present allowance of meat (1lb.) should be left unchanged. The bread might will be increased by 4 oz., making it then 20 oz., at the same time grant daily butter 1 oz., and oatmeal 1 oz. In place of the oatmeal, a similar quantity of "soojie" might be given at the men's option.

It is questionable whether cheese would be either a popular or suitable issue for India, and therefore is not recommended.

The following table shows the value of the suggested additions.

Additions.	Gross Total.	Water Free.	Albuminates.	Fats.	Carbo-hydrates.	Salts.	Nitrogen.	Carbon.	Potential Energy.
	oz.	oz.	oz.	oz.	oz.	oz.	grains	grains	f. tons.
Bread	4·	2·4	·32	·06	1·96	·05	22·	464	373
Butter	1·	·9	·003	·91	...	·03	·2	812	342
Cabbage ...	8·	·7	·14	·04	·41	·06	9·6	136	90
Oatmeal or Soojie	1·	·83	·12	·05	·63	·03	8·7	168	132
Total ...	14·	4 83	·583	1·06	3·	·17	40·5	1080	937

The deductions proposed to be made from the ration have the following value.

Deductions.	Gross Weight.	Water Free.	Albuminates.	Fats.	Carbo-hydrates.	Salts.	Nitrogen.	Carbon.	Potential Energy.
	oz.	oz.	oz.	oz.	oz.	oz.	grains	grains	f. tons.
Potatoes ...	4·	·96	·08	·005	·84	·04	5 5	180·	129
Rice	4·	3·6	·2	·032	3 38	·032	14·	700·	511
Total ...	8·	4·56	·28	·037	4·22	·072	19·5	880·	640·

The net result of the changes proposed in this ration would be as follows.

	Gross Weight.	Water Free.	Albuminate.	Fats.	Carbo-hydrates.	Salts.	Nitrogen.	Carbon.	Potential Energy.
	oz.	oz.	oz.	oz.	oz.	oz.	grains	grains	f. tons.
Existing Ration,	55·86	24·04	3·72	1·372	16 99	1·264	256·5	4503	3527
Proposed deduction ...	14·	4·83	·583	1 06	3·	·17	40·5	1080	937
Total ...	69·86	28·87	4·303	2·432	19·99	1·434	297·	5583	4464
Proposed deduction ...	8·	4·56	·28	·037	4·22	·072	19·5	880	640
Net Total ...	61·86	24·31	4·023	2·395	15·77	1·362	277·5	4703	3824

The details of the proposed ration for India, as amended above are given in Appendix VI. It will be observed that this amended diet does not quite agree with the European standard scale in certain particulars, mainly in the respective quantities of Nitrogen and Carbon. But whether a man needs as much Nitrogen in India as he does in Europe is open to doubt. The balance of opinion among medical officers who have served in this country inclines to the belief that less is required: with this opinion the experience of the writer entirely agrees. Presuming such an estimate of the needs of the economy to be correct, the amount of Nitrogen contained in the proposed ration may be considered adequate: while the Carbon can hardly be deemed excessive. The amount of Energy obtainable from the diet is eminently satisfactory, when compared with the standard. Further the cheapness of food in India, will only too easily permit of the men meeting any deficiencies of Nitrogenous matter by private purchases. The continuance of a *partially* free ration in India is to be regretted: but it is only too probable that the question of finance will be as much an obstacle in the way of the introduction of a *completely* free ration as it is at home. The strength of the British troops in India may at a very liberal estimate be placed at 80,000 men. The cost of the suggested additions to the diet would be for that number of men, about 44 lakhs of rupees: while the intended deductions would amount to 9 lakhs. The net cost of the proposed changes would therefore be about 35 lakhs of rupees per annum: or less than 50 rupees for each man a year. Before closing the subject of the ration in India, the writer would here express his conviction that much benefit would accrue to the men, if they were compelled to cook their own food, rather than have it done for them by natives. This could be done without detriment to the men's health in the Punjab and on the north west frontier during the cold season, and in the hills all the year round. In the plains during the hot weather, native aid in this direction would still be advisable.

5. THE PREVENTION OF SCURVY AMONG TROOPS, AND THE RATION IN WAR.—From the preceding observations it appears that the soldier in Peace is engaged in such duties as entail a liberal daily allowance of food, not only to meet his actual wants of the time being, but enough to allow a margin for contingencies. War is the most important of the contingencies of a soldiers life, and at that time he is called upon to do arduous duties. Whether he can meet the demands made on him at the outbreak of hostilities will depend upon the nourishment and training he has received during Peace: Whether he can continue to meet the demand will depend mainly upon the food he gets during hostilities. History offers only too many instances of armies having been paralysed owing to defective dietary and faulty arrangements for meeting the alimentary needs of troops in the field. The attack by the Americans upon Canada in 1813 failed from no other reason but the diseases engendered by defective feeding. Of a force of 2500 men, no less than 1800 were scorbutic. Alcock tells us how the British Legion in 1837 under Sir de Lacy Evans were literally starved upon their rations which, nominally 1 lb. of meat and 1½ lbs. of bread, were in reality not more than 7 oz. of the one, and 12 oz. of the other.

An inefficient Commissariat has ever been the bane of the army. In 1824 in Burma, no less than 1311 men died out of 2716. The majority of these were from Scurvy. Twenty two years later in the expedition to China, the same tragedy was repeated. Coming to more recent times we have the records of the state of the British Army during the first winter in the Crimea when the troops suffered so severely from fatal sickness, a primary factor of which condition was the want of adequate nutriment, and the outraging of all hygienic rules in respect of sufficiency, quality, variety and cooking of the food : the rations consisting almost exclusively for a considerable time of salt meat and biscuit, without vegetables.*

One disease stands out prominently as being the scourge of armies in the great wars of the past. This disease is Scurvy. Experience has shewn it to be essentially a dietetic disease. The introduction of scientific principles into the feeding of both the army and the navy has in great measure banished this disease from the services. Scurvy is essentially an acquired condition of the body : as usually observed it is characterized by increased debility, with muscular pains in the loins and legs. The skin is dry, cool, and rough : complexion muddy, expression despondent and gait sluggish. The tongue gets flabby, the gums slightly tumid and very liable to bleed. Patients complain of being "played out" have pains resembling rheumatism; often palpitation or dyspnœa. Night blindness is a suggestive symptom, while diarrhoea, ecchymoses and ulcers are almost pathognomonic.

Its infrequency in civil life renders it unfamiliar to the body of the profession, while the age we live in, and the knowledge we possess as to its prevention, give us a false sense of security from a disease which has in former days been the scourge of fleets and armies. Pliny mentions it as occurring in the Roman army under Germanicus (A. D. 13). It especially affected nations in their progress from barbarism to civilization when the art of war usurped the practice of agriculture. Tacitus writing in A. D. 70, mentions how Scurvy affected the army of Titus at the siege of Jerusalem, and too the army in the wars of Civilis in Germany. In 1260 the army of Louis IX was almost destroyed by this disease, while in 1556 it devastated Brabant, and all Holland and parts of England in 1562.

The "London Bills" in 1701, the records of our naval and military expenditions during the 18th century only too fearfully detail what ravages it committed before the efforts of Lind, Trotter and Blane in 1795 bore fruits in prophylactic measures being adopted in the navy. This diseased condition has been satisfactorily connected with a deficient dietary. Its prevalence in camps, in prisons and on shipboard where the only constant dietary factor is the limitation of the food supply to a certain issue [illegible] proves this. Its cause has been sought among the articles which constitute the ration. Salt meat as forming the staple of former diets, had for long to bear the opprobrium of its production. Further observation however showed its connection not so much with the salted

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* Longmore on "Sanitary Contrast of the Crimean War."

esh vegetables and monotony of diet
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e visitations. The theories built
scurvy have been numerous.
consequence of defective
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have been advanced by emin
opinion of Sir R. Christison** that a
principles especially albumen and casein is the
ypothesis is of some interest, as evidence recently
fact that an obscure affection observed in India and
olid œdema" but in some features analogous to Scurvy ;
sease which affected the British troops in Burma, (1886)
as "beri-beri" (Japanese kakke), both though unaffected by
al antiscorbutics were readily amenable to a highly nitrogenous
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** Christison on Scurvy, Edinburgh Monthly Journal of Medical Science, June and July 1847.

* Brit. Med. Journal October 23rd 1856, also Morehead's work on "Analogy between Scurvy and Beri-beri."

† Garrod. "On Nature, causes and Prevention of Scurvy" Edin. Monthly Journ o Med. Science, January 1848 p. 457.

‡ Aitken "On health of Troops in Bulgaria" Journ. Roy. Med. Chir. Soc. Volume XL.

¶ See writings of Blane, Trotter, Lind. Budd, Curron and Aitken. The experiences of Crimea, and evidence given before Committee on Scurvy in Arctic Expedition, 1877.

Ralfe. Monograph on the General Pathology of Scurvy, 1877.

§ Lander Brunton. Pharmacology and Therapeutics page 368.

food, as with that deprivation of fresh vegetables and monotony of diet which is its normal accompaniment. This has been found to hold good in individual cases as well as in epidemic visitations. The theories built on these observations as to the causation of scurvy have been numerous. The general opinion is that scurvy is mainly a consequence of defective rather than deficient nutrition. Notwithstanding th[illegible] evidence in favour of the opinion that scurvy is caused by [illegible] of fresh vegetable food, other views have been advanced by eminent authorities. The chief of these, is the opinion of Sir R. Christison** that a deficiency of the nitrogenous principles especially albumen and casein is the cause of scurvy. This hypothesis is of some interest, as evidence recently obtained points to the fact that an obscure affection observed in India and there known as "solid œdema" but in some features analogous to Scurvy; and another disease which affected the British troops in Burma, (1886) and known as "beri-beri" (Japanese kakke), both though unaffected by the usual antiscorbutics were readily amenable to a highly nitrogenous diet.* Dr. Garrod† refers the production of Scurvy to the absence of Potash; while Dr. Aldrige assigned the greatest influence in the productions of the disease to the absence or deficiency of Phosphorus, Sulphur and Lime. The arguments in support of these opinions have not been sufficient to lead to the general adoption of any of them. Although Scurvy is mainly a disease of malnutrition, having as its invariable antecedent a deficiency or absolute want of certain substances usually supplied by fresh vegetable food, there are various conditions which though of themselves insufficient to produce the disease, yet powerfully contribute to its early appearance, and aid in its development. Generally described these conditions are such as interfere with nutrition and lower the standard of health. The more prominent of them seem to be exposure to malaria,‡ deprivation of sunlight, impure or damp atmosphere, cold, absence of exercise, a diet deficient in fresh meat and fatigue.¶ Various attempts have been made to determine the precise pathological conditions in Scurvy. Some attribute it to an acid and others to an alkaline condition of the blood. Chemical pathologists of the present day have not thrown more light on the subject than their predecessors. Ralfe ‖ thinks that the primary change in Scurvy is a chemical alteration in the blood: this alteration being a diminution of the alkalinity, which again is due to an increase of acid salts (urates) within, and a withdrawal from the blood, of the alkaline carbonates. Brunton § is inclined to the

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‖ Ralfe. Monograph on the General Pathology of Scurvy, 1877.

§ Lauder Brunton. Pharmacology and Therapeutics page 368.

belief, that it is due to an increase of the chlorides of the blood ; particularly of sodic chloride either absolutely or relatively to the carbonates. Although it may seem an unnecessary truism to be enunciated, the most important consideration to prevent the occurrence of Scurvy among troops is the maintenance of health at a high standard. This necessarily implies the avoidance of all causes tending to impair the nutrition of the body. But the very circumstances of war, entail and call into existence those causes and even in the best regulated campaigns immunity from hardship and fatigue cannot be obtained. In such cases it is advisable to adopt measures to oppose these conditions. The chief of them is to secure a modification in the dietary involving an increase of the vegetable elements, or of such fruits and their juices as possess antiscorbutic properties. The chief of these is the lime or lemon, this given as juice in daily issues of an ounce has been found to be of the greatest value as a prophylactic against Scurvy. The value of these fruits was first recognized in 1573 by Solomon Albertus.* Thanks to Lind and Trotter lime juice was introduced into the navy in 1795, and has been productive of a marvellous reduction in the prevalence of scurvy. In the absence of vegetables, though the value of limejuice as the best of antiscorbutics has never been questioned, yet it has not been definitely decided upon which of its constituents its valuable properties depend. Like all vegetable juices it is a complex substance. It contains citric acid chiefly, a little malic and tartaric acids, sugar and vegetable albumen, mucus and mineral substances with from 80 to 90 per cent. of water. (Appendix VII.) It is probable though not demonstrated that the citric acid is the valuable ingredient. Limejuice either evaporated or preserved with glycerine is rendered both durable and portable. It has been made into lozenges † and into biscuits ‡ but with indifferent success.

In the navy it is fortified by 10 per cent. of Brandy. and usually requires half its weight of sugar to be palatable. One ounce of the juice contains 25 to 30 grains of anhydrous citric acid. Other substances besides limejuice have been used with effect to ward off scurvy during scarcity of vegetables. In the Crimea the French used a salad made of the taraxacun leontodon ; during the American Civil war, the terrible dearth of vegetables was met by a free use of chenopodium album : of rumex acetocella : pickles, vinegar and molasses. In India "anola" the fruit of phillanthus emblica, and tamarinds, also "amchur" made from mangoes have very considerable repute among the natives as antiscorbutics. This latter has been officially recommended¶ as a substitute for limejuice, if the latter be scarce. "Amchur" contains citric and malic acids, its acidity in terms of the former is eqivalent to 14·93 per cent. It can be taken with water or mixed with vegetables. No stronger evidence exists than the accounts of the Arctic expedition under Sir G. Nares, 1876, of the value of limejuice when vegetables are deficient. On the other hand it must not be forgotten that scurvy can be warded off without limejuice if the diet be varied and sufficient. No better instance of this can be quoted than the voyage of the Vega.* This steamer contained 10 officers and 20 men, and was frozen up in ice for ten months to the north of Siberia : yet during the two years of the expedition no one died, and not a single case of scurvy occurred. As the dietary of the ship was peculiarly efficient it is given in detail in Appendix VIII. No limejuice was used, but vinegar with occasional issues of cranberry juice. As bearing directly on the prevention of Scurvy and the maintenance of health, particularly of troops on service, the dietetic value of alcohol may be here discussed. The question of the desirability of alcohol as an article of diet in health is so large, that it is very difficult to give a satisfactory reply to it. From the writings of Luroy, Parkes, Anstie and Dupre it is apparent that within certain limits alcohol is ingested and converted into energy by the system. Anstie and Parkes both agreed in assigning about one fluid ounce of absolute alcohol, which is equivalent to 2½ or 3½ fluid ounces of ordinary spirit, as the limit of moderation : or the quantity that can be disposed of in the organism of an adult without producing injurious effects on the bodily functions. The evidence is conflicting whether the moderate use of alcohol as above defined is conducive or not to the maintenance of perfect health. Personally the writer thinks it is : but one fact stands out clearly, and that is if work is to be done, it must be taken after the work is finished and not before. Evidence is unanimous in the condemnation of the employment of the spirit ration *during* the fatigue of marching : on the other hand testimony is in favour of its being given when the fatigue of the day is over. It then exerts a beneficial reviving effect followed by a feeling of warmth, with a removal of the wakefulness of exhaustion.† The influence of alcohol for or against the prevention of Scury is practically identical with its influence upon nutrition. As regards its issue as a part of the ration in war, the writer thinks it is not absolutely necessary, though in some cases probably beneficial. All evidence is opposed to its possessing any power of increasing the amount of work above that which could be done without its use. Some observers state that it actually diminishes the capacity for work. On the other hand it must be remembered that a large proportion of the soldiers are accustomed in daily life to alcohol in some form or other, and previous habit or custom may be regarded as reasonable ground for its issue. However the balance of opinion is in favour that whenever its deprivation is not opposed to custom or to acquired habit it would be advisable to refrain from it use and issue as a regular ration. Should its issue on service be needed such should be subject to the two conditions. (1) No issue before the evening, and then only when the men are settled for the night. (2) The issue not to exceed the equivalent of one fluid ounce of absolute alcohol. As to the exact method of issue, the custom in our own army has been to give it as rum : in this matter we might advantageously follow the continental custom of giving the lighter red wines or even beer. The substitution of tea for alcohol is attended with much benefit. In the form of compressed tea, its use and issue would be easy. Tea has been found an excellent drink taken cold on the march,* and is infinitely preferable to alcohol at the midday meal. At night it has a tendency to cause wakefulness. Its use at this period as a stimulus after a hard days work could be suitably replaced by beef-tea, in the form of extract of beef or a condensed soup. The large quantities of salts and organic acids in these preparations favour the supposition that they may act not only as refreshing and invigorating, but as antiscorbutic articles of diet. Allusion has already been made to the fact that once hostilities commence, how important it is to maintain the due relation between the food and work of the soldier. The unavoidably hard work demanded of the men at such times causes an extraordinary loss and waste in the organism, and demands a corresponding supply of food for repair, if a total break down in strength of the individual and therefore subsequently of the whole army is to be prevented. The problem of repairing this waste in the quickest and most efficient manner when the troops have but short pauses for rest will always be a difficult one to solve. The principle of furnishing a sufficient supply of food to an army on active service has long been recognized by the formulating of field rations. The first record of a fixed field ration is in the warrant of 1830 which authorized an issue of 1½ lbs. of bread or 1 lb. biscuit and 1 lb. of meat, either fresh or salt to all troops in the field at a stoppage of 5*d.* with discretionary powers to the officer commanding to grant spirits or any other necessary.

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* See John Woodall in Surgeon's Mate, London 1617, also in "Kramin Medicina Castrensis," Vienna 1720.

† Lozenges made by Gale and Bell & Co., Oxford Street, London, W.

‡ Biscuits made by White and Co. Sunderland.

¶ Surgeon Generals H. M. Forces India, Circular of the 13th April 1884.

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* Voyage of the Vega from June 22nd 1878 to April 24th 1880 by Professor Nordenskiold, 2 Volumes, London 1881.

† Report on the issue of a Spirit Ration during the Ashanti campaign 1874 by the late Dr. Parkes.

In 1848 this was modified, and the following given to troops in the field at the Cape: namely bread 1 lb. or meal ¾ lb. or biscuits 1 lb. fresh meat 1½ lb. or salt meat 1 lb., rice 2 oz., sugar 1 oz., coffee ¾ oz., salt $\frac{1}{12}$ gill, spirits $\frac{1}{28}$ of a gallon, also ¼ lb. of tobacco and ¼ lb. soap weekly. Two years later the ration was restricted to 1½ lb. bread or 1 lb. biscuits, and 1 lb. of meat either fresh or salt. It was however found necessary to deviate from the above in the case of the army in the Crimea, when the ration issued consisted of bread 1½lb. or biscuits 1 lb., meat 1 lb., (fresh or salt) rice 2 oz., salt $\frac{1}{16}$ oz., sugar 2 oz., coffee 1 oz. or tea ¼ oz., pepper $\frac{1}{32}$ oz. rum $\frac{1}{32}$ oz., and lime juice 1 oz. Since then no regular ration for field service has been authoritatively laid down. The issue for the field being usually promulgated specially for each individual campaign. Of late years the field ration has followed more or less the lines of the Crimean. Details as to such in various recent wars are given in Appendix IX. Adopting the standard diet for ordinary work as the index of the requirements of the soldier in Peace, we may in like manner take the standard diet for hard work, say over 300 foot tons daily, as the representative of the needs of a soldier in the field. As the standard for hard work, one may take the mean of two diets proposed respectively by Playfair* and Parkes.† This consists of albuminates 5·5 oz., fats 3 oz., carbohydrates 20 oz., salts 1·5 oz.; in all 30 ounces of water free food, containing 380 grains of nitrogen, 6,050 grains of carbon, and offering 5,250 foot tons of Potential Energy. Having no definitely authorized war ration, one cannot compare it with this standard. A reference to Appendices IX. and X. will show that the average issue of food both in our own and foreign armies when on active service falls far short of the standard diet for hard work. Professor DeChaumont‡ has proposed the following as a varied and liberal war ration, bread $1\frac{1}{4}$ lbs., fresh meat (without bone) 1 lb., peas or beans 3 oz., potatoes or green vegetables 1 lb., cheese 2 oz., sugar 2 oz., salt $\frac{1}{2}$ oz., pepper $\frac{1}{20}$ oz., ground coffee 1 oz., tea $\frac{1}{2}$ oz., red wine 10 oz., or beer 20 oz. No spirit ration to be given, except under special order. The nutritive value of this diet is about 380 grains of nitrogen, and 5,000 grains of carbon. This ration is undoubtedly sufficient for the ordinary fatigues of war, and might be easily supplemented in cases of extreme exertion. It contains 5·75 oz. of albuminates, 2·2 oz. of fats, 15·76 oz. of carbohydrates and 1·3 oz. of salts. Though this ration in all respects meets the needs of field service, and offers itself as a safe type of war ration, and one which if the circumstances of war permitted should be issued, yet we find that practically no Government can maintain a sufficient commissariat and transport service to furnish such to troops in the field. The chief difficulties hitherto met with, in this respect have been the impossibility of supplying cattle for the meat issue, either rapidly enough or in sufficient quantity : and the bulkiness of the other articles.

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* See some apposite remarks on this question in the "Soldiers Pocket Book" by Lord Wolseley.

It is obvious from the nutritive value of fresh meat that it should form as large a proportion of the meat diet as possible. The difficulties in the way of the application of this principle are shewn in the experiences of the Germans in the war of 1870. Though operating in one of the richest and most fertile parts of Europe, and under exceptionally favourable circumstances, it was only by the greatest efforts they were able to prevent their men from dying of hunger at times. Often for 6 or 7 days they were quite without meat.¶ If such can occur in a fruitful land, how much more must be the difficulties in this respect if the campaign lies in a desert, or a semi-cultivated district. With a view to meet these objections, attention has been given to the question of a more extended use of Concentrated and Preserved Foods. This very idea has however given rise to some misconception, so much so, that people have been known to think that food sufficient for 24 hours, can be so concentrated as to be carried in the the watch pocket : or even as a lozenge. When we remember that the smallest amount of food necessary for existence is represented by quite 15 ounces of water-free food, we can understand that the amount for a labourer doing hard work, or for a soldier in the field cannot be reduced, even theoretically, below 24 or even 30 ounces. Further practically we find that if the water be driven off in this way, by drying, we have the food in such a state, that it cannot be taken up and assimilated by the system. The preservation of alimentary substances particularly meats is a problem which has long been worked at. Recent discoveries as to fermentation have given a great stimulus to these researches. Up to the present, the results obtained are only partially satisfactory. The temporary disproportion between supply and demands of food during hostilities, the rapidity with which troops must move, and the difficulty for flocks and herds accompanying an army, even without taking into consideration the deterioration in the quality of the flesh of constantly moving cattle[*] has rendered the more extended use of Preserved and Concentrated foods absolutely necessary. Though these foods will never fully compensate for the want of the fresh articles, the important role which this class of aliments must play in any future war as tending towards efficient feeding and rapid movements of troops has been emphasized by the recent writings of the German Von der Goltz[†] and the French General Lewal.[‡] The latter writes "marches rapides, bonne alimentation des troupes, presque toute la guerre se trouve renformée dans ces deux termes. L'un ne saurait être sacrifié a l' autre. Je crois que celuiqui aura les moyens de faire á propos deux grandes marches de suite et de se passer de des couvoies pendant quatre jours sera maitre de la victoire." The need of foods of this kind has been so long felt, that a mere enumeration of the inventions to attain their production would entail much space.

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* Playfair "On the Food of man in relation to his useful work," 1865

† Parkes, "Manual of Hygiene" page 199.

‡ DeChaumont, Journal U. S. Institution Vol. xiv. page 355, also Parkes Hygiene 6th Edit. p. 558.

¶ Captain Hönig-Zur Geschichte der Verplegung der Deutschen aure in Kriege, 1870-71.

Speaking generally, the systems employed to preserve and concentrate food are based upon one or more of the following plans. 1 Freezing. 2 Drying. 3 Salting and the use of various chemical agents. 4 The exclusion of air, and hermetically sealing in tin cases. The employment of frozen food does not appear to be in any way applicable to the needs and circumstances of war. To dried food, its unattractive appearance and insipidity offer many objections. In this category we may consider such forms of dried meat as the "tassajos" or "chargui" of South America, the "biltong" of the Kaffirs, the "Kelea" of the Arabs, and the "dauer-fleisch" which the German, made use of in 1870. Such are nutritious and to which by use one gets accustomed : but it is necessary that they be well prepared. The writer lived for many months upon "chargui" in Peru, and can speak authoritatively : boiled it is detestable, over cooked it is tasteless, but if fried with fat and vegetables it makes an agreeable repast. The Brazilian national dish "fejoda" is nothing but sun dried meat with black beans. The value of this class of meats has not been tried to any extent on service: but from what is known of them, their use except in extreme necessity is unadvisable. Salting of meat is a well known form of preserving. Owing to the great loss of the nutritive qualities, which meat suffers in the process, the use of salted meat to any extent is not to be recommended : while too its bulk is against its portability. Besides salt all kinds of chemical agents have been tried as food preservers, such are Boracic acid, Phenic acid, Salicylic acid, together with coatings of fat, glucose, paraffin and gelatin. The French tried several of these methods during their manœuvres of 1875 and 1878 but with indifferent results. Förster and others have shewn that these chemical methods are injurious to proper digestion, and consequently unsuited for the rationing of troops.[*]

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[*] In 1870 during the Franco German war, it was found that as a rule only 41 part. by weight of the cattle were flesh ; the remaining 59 parts being bone.

[†] Von der Goltz, "Das Volk in Waffen," Berlin 1883.

[‡] Lewal, "Etudes de Guerre, tactique de marche" Paris 1886.

The tinned foods stand out pre-eminently as the best for all military purposes. Not only meats but every species of food has been and can be preserved by means of hermetically sealing. The potted and preserved meats such as the Chicago and Australian kinds speak for themselves. From analysis their nutritive qualities appear to be nearly identical with fresh meat, while the absence of bone renders them weight for weight of increased value : to say nothing of their compactness, durability and portability. Their saltish taste renders their prolonged use distasteful but a greater employment of pickles and condiments will in great measure meet this defect. In regard to other organic products, the processes of preservation have reached some perfection. Milk either with or without sugar is sold both concentrated and preserved with all the qualities of the fresh article. (See Appendix XI.) Tablets of dried milk made by Keller and Martin de Lignac of Paris, are not satisfactory as during the process of manufacture very considerable loss of casein takes place. Eggs too are valuable when preserved either by milk of lime, oil, butter, wax, collodion or vinegar. The writer from experiences with the Chilian army in the desert of Tarapacah, can testify to the great value of preserving hard boiled eggs (without shells) in boiling vinegar. Taken with cold tinned meat, they are by no means an unpalatable dish. Biscuits are a valuable and familiar form of cereals in a preserved state. They contain very little water, and bulk for bulk are more nutritious than bread. Three-fourths of a pound are considered equal to one pound of bread. Their bulk is small, and they are easily transported. Like flour, they are deficient in fats, and they, after a time, are apt to set up indigestion. In consequence of these facts men do not thrive well on them.

If attainable, bread should always be issued, and biscuits used only in extreme cases and when unavoidable. Bread has been preserved by exposing it to hydraulic pressure (Laignel's method) : when taken out the bread is still moist, but soon dries and becomes as hard as a stone.

In this state it keeps for a very long time, and when resoaked in water is both good and agreeable. The "pain biscuite" of the French army is bread dried by heat. Cheeses too are capable of storage if hermetically sealed in tins, and as such are very portable. In the Russian army their use has been tried and found satisfactory.[‡] In regard to the preservation of vegetables the chemical examination of the preserved potato as made by Edwards, shows that it retains all the constituents of the fresh tuber. (See Appendix XI.) It is palatable and conveniently condensed, one part being equivalent to $3\frac{1}{2}$ parts of the fresh potato. Cabbages have been largely preserved as pickles, but owing to the bulkiness of pickled preparations, under this form their use on service is limited. Specimens of tinned fresh cabbages and carrots are found to retain the essential qualities of the fresh and original articles. (See Appendix XI.) Mixed vegetables have been preserved by the simple process of drying after the manner of Masson: this has been modified by Chollet who after drying subjects the vegetables to hydraulic pressure. The resulting article though highly portable, is hardly of equal nutritive value to the fresh vegetables, owing to the loss of essential juices. Though used as a substitute for fresh vegetables, it is probable that their nutritive value is not high, and that as antiscorbutics the dried and compressed mixed vegetables are very inferior (see Appendix XI.) During the past twelve months, an attempt has been made in India, to preserve potatoes, carrots, onions, turnips etc etc. etc., after the method of Dr. Hall. This consists of slicing the articles into thin sections, and exposing these to the sun for a few hours: and subsequently sealing them up in tin cases.*

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[*] Journal d' Hygiene Paris 1880.

[†] Dingler's Polytechnisches Journal, 1884 p. 170.

[‡] Der Militarwockenblatt No. 97—1879.

Up to the present this effort to preserve vegetables in India has not been very successful, mainly due to the slovenly and unscientific manner in which it has been carried out. Although fruits have been preserved for many years, their use in European armies is practically *nil.* Those of the feculent class such as chestnuts have an undoubted high alimentary value, sufficient almost to justify their classification with the legumes. Fruits when dried and preserved are portable, and at the same time capable of giving variety to the soldiers fare. Dates, Normandy pippins apple chips and the many kinds of American tinned fruits could be used with marked advantage in the army. As an outcome of the principle of using condensed and preserved food for troops, and further to attain efficient feeding with maximum mobility for an army in the field, the idea has been conceived whether a food could not be prepared, which while possessing the essential qualities of compactness, portability, durability, agreeability to taste and eye, with facility of preparation, should yet in itself contain sufficient quantity of the alimentary elements necessary to the support of an adult for one or more days. Such preparations may be termed *Prepared* or *Concentrated foods*, as distinguished from mere Preserved foods: and are intended to meet any failure in the supply of the daily ration, such as might occur during a break of the communications, or during any sudden concentration of troops, or in forced marches. Foods of this kind constitute the so called "iron" or "eiserne" ration of the Germans: by which allowance is understood those provisions given to each soldier in the field for emergencies. Many different foods have been recommended for this purpose, and some have been tried experimentally in different armies. Among them one may include the concentrated soups, meat extracts, the various Erbswursts and peasausages, the meat powders, meat biscuits and Pemmican.

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* Instructions contained in Circular 2082 of November 22nd 1886 from Commissary General, Bengal.

The concentrated soups date from the introduction of Liebig's meat extract. Numerous articles of this kind are in the market, notably those of Brand, Kemmirich, Johnson and others, which exist chiefly in the form or fluid meats, essences, extracts &c., &c., &c. As Gautier* says, these from their composition are not capable of replacing a true alimentary substance, nor even are they the presentation of the least quantity of meat, either roast or boiled. They are merely the juices of meat, and not the meat itself. An extraordinary large number of these meat extracts are now in the market, but it is only too probable that many of them are not true meat extracts, but artificial substitutes. The author has devoted considerable attention to the composition of these preparations (see Appendix XII.) and would direct attention to the fact that a good meat extract should have less than 20 per cent. of water : it should contain almost 25 per cent. of its weight of mineral meat salts, one quarter of which should be phosphoric acid in combination with potash, not with lime : it should when dissolved in warm water yield but an insignificant precipitate on the addition of double the amount of alcohol : it should be solid or nearly so ; free from all excrementitious odour and from a burnt flavour. As Liebigs extract fulfils these conditions better than any other, it may be taken as the best representative of this class of Preparations. The attention of Government cannot be too forcibly directed to these remarks as nothing is more fatal than false economy in an article of this kind, Kemmerich,† Möller ‡ and Grandeau¶ proved that a diet composed exclusively of meat extracts, killed animals more quickly than total deprivation of food. These soups are not however quite without alimentary value. They act as stimulants, food regulators and digestive agents rather than as providers of nitrogenous matter. (Appendices XII and XIII). It would he a fatal mistake to add these extracts to the soldiers ration, deluded by their portability, and with the idea that they in small compass contained considerable reparative materials. They are essentially alimentary aids and not true foods. If used solely in that sense they can be turned to very good account as stimulants during and after very great exertion. The original Erbswurst of the Germans was a sausage of pease with bacon fat. Numerous preparations of this kind are now sold as *Prepared Foods*.

They consist in the main of powdered pease with beef or bacon fat and condiments : the whole being enclosed in a water proof cover, and then made into a sausage or packet. Some few also contain powdered beef. The nutritive value of several kinds is given in Appendix XIV. Eabswurst soon becomes distasteful, causing digestive derangements in consequence of the excess of fat which it contains : it at the same time lacks the sustaining qualities of fresh meat. The souptablets (erbsen supper tafeln) of Neumann of Panen are made of meat juice with pea flour (Appendix XIV). Their relatively high amount of salts is said to be due to sodic chloride.

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* Gautier. Chimée appliquée à l' Hygiene, page 116 Paris 1874.
† Kemmerich. Wiener Medizinische mochens hrifte, 1869.
‡ Muller. These de l' Université de Paris, 1870.
¶ Grandeau. Soc. Chirurgique de Paris, 1863, (comptes rendus Vol. xxii.)

condensed, one part being equivalent to [illegible] Cabbages have been [illegible] preserved [illegible] ness of [illegible] prepared [illegible] limited. [illegible] retain the [illegible] Appendix XI [illegible] process [illegible] by [illegible] The resulting art[illegible] value to the fresh vege[illegible] Though used as a [illegible] nutritive value [illegible] compressed mixed vegetables are very [illegible] During the past twelve months, an attempt has been [illegible] preserve potatoes, carr[illegible] of Dr. Ha[illegible] [illegible] them to the sun for a few hours [illegible] them [illegible]

Up to the present [illegible] been very [illegible] in which it has [illegible] for many years, [illegible] of the [illegible] fruits [illegible] dried [illegible]

[illegible]

The concentrated soups date from the introduction of Liebig's meat extract. Numerous articles of this kind are in the market, notably those of Brand, Kemmirich, Johnson and others, which exist chiefly in the form of fluid meats, essences, extracts &c., &c., &c. As Gautier* says, these from their composition are not capable of replacing a true alimentary substance, nor even are they the presentation of the least quantity of meat, either roast or boiled. They are merely the juices of meat, and not the meat itself. An extraordinary large number of these meat extracts are now in the market, but it is only too probable that many of them are not true meat extracts, but artificial substitutes. The author has devoted considerable attention to the composition of these preparations (see Appendix XII.) and would direct attention to the fact that a good meat extract should have less than 20 per cent. of water: it should contain almost 25 per cent. of its weight of mineral meat salts, one quarter of which should be phosphoric acid in combination with potash, not with lime: it should when dissolved in warm water yield but an insignificant precipitate on the addition of double the amount of alcohol: it should be solid or nearly so; free from all excrementitious odour and from a burnt flavour. As Liebigs extract fulfils these conditions better than any other, it may be taken as the best representative of this class of Preparations. The attention of Government cannot be too forcibly directed to these remarks as nothing is more fatal than false economy in an article of this kind. Kemmerich,† Möller ‡ and Grandeau¶ proved that a diet composed exclusively of meat extracts, killed animals more quickly than total deprivation of food. These soups are not however quite without alimentary value. They act as stimulants, food regulators and digestive agents rather than as providers of nitrogenous matter. (Appendices XII and XIII). It would be a fatal mistake to add these extracts to the soldiers ration, deluded by their portability, and with the idea that they in small compass contained considerable reparative materials. They are essentially alimentary aids and not true foods. If used solely in that sense they can be turned to very good account as stimulants during and after very great exertion. The original Erbswurst of the Germans was a sausage of peas with bacon fat. Numerous preparations of this kind are now sold as *Prepared Foods.*

They consist in the main of powdered pease with beef or bacon fat and condiments: the whole being enclosed in a water proof cover, and then made into a sausage or packet. Some few also contain powdered beef. The nutritive value of several kinds is given in Appendix XIV. Erbswurst soon becomes distasteful, causing digestive derangements in consequence of the excess of fat which it contains: it at the same time lacks the sustaining qualities of fresh meat. The souptablets (erbsen suppen tafeln) of Neumann of Panen are made of meat juice with pea flour (Appendix XIV). Their relatively high amount of salts is said to be due to sodic chloride.

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* Gautier. Chimie appliquée à l' Hygiene, page 116 Paris 1874.
† Kemmerich. Wiener Medizinische wochenschrifte, 1869.
‡ Müller Thèse de l' Université de Paris, 1870.
¶ Grandeau. Soc. Chirurgique de Paris, 1853, (comptes rendus Vol. xxii.)

It would be necessary to take 21 ounces of this preparation to get the proper quantity of albumen, yet with that one would obtain only ·6 oz. of fat, which is absolutely insufficient. A similar defect is present in the pease and haricot cakes of Schorke, and the meat cakes of König of Maience. Rumford's soup contains pieces of meat with flour, pearled barley and salt. Like Schorke's preparations it does not constitute a complete aliment. Edward's dessicated soup was well spoken of in the Ashanti and Afghan campaigns. It consists of a mixture of beef and vegetables, and is easily prepared by boiling an ounce in a pint of water. Kopf's concentrated soup though now no longer in the market, was a similarly satisfactory preparation.

Allusion may here be made to "Panole" which is a preparation made of ground parched corn 3 parts, and sugar 1 part. It is used largely in the expeditions on the south west frontier of the United States, and has a high reputation in the American Army. An English and at the same time a very good preparation is Corbin's "Pea and Lentil soup" (Appendix XIV.) This is sold in ¼ and ½lb. packets and can be had of four different kinds. If 8 ounces of this be carried on the person with 12 ounces of Biscuit, as an "eiserne" ration it offers a fair days sustenance.

Three days ration of such, carried by a man, adds barely 4 lbs. to the weight of the accoutrements. Such while being portable is at the sometime readily prepared for consumption. Appendix XVI illustrates the practical value of such an "eiserne" ration, as tried by the writer upon himself. This preparation is well worthy of trial by the Government: and used either alone or combined with an issue of Chicago meat would make an excellant "emergent" ration for troops in the field. It contains all the good points of an Erbswurst, without being so productive of gastric disturbance as are those preparations. To further test the value of this food, the writer on a subsequent occasion placed himself upon the following ration daily. Chicago meat 4 oz. Corbin's soup (mark A.) 4 oz. Biscuits 12 oz. Brand's essence of Beef 1 tin : Tea ¼ oz. When subsisting on this ration only, the writer for seven consecutive days walked 12 miles on the flat carrying as dead weight 60 lbs. During this period the mean daily elimination of Nitrogen by the urine was 297 grains : and at the termination of the experiment the total loss in body weight was 1¼lbs only. Such results must be accepted as being remarkably good, and as offering sound practical proof of the value of such a dietary in times of emergency. Another English preparation is Morel's field ration, sold as a sausage, weighing 18 ounces (Appendix XIV.) Nine ounces of this with twelve of Biscuit carried as an "eiserne" ration offer as sustenance 317 grains of Nitrogen and 3600 grains of Carbon. From a practical trial of it, made by the writer on himself, as with Corbin's soup, it was found agreeable for three or four days, but beyond that period productive of some dyspepsia. In all this class of *Prepared Foods*, we find a marked excess of Fats and Carbohydrates. The salts are variable, though in all cases much in excess of the meat quantities. Although these preparations yield the alimentary eliments of a complete food, yet they are in such proportion as only to serve as food for a limited time.

Further in most of them the albumen is vegetable, being derived from peas and beans. Although the chemical value of animal and vegetable albumen seems the same, yet experience shows the former to be very much more easily and completely assimilable. Another class of preparations are the meat powders. In them the albuminous constituents are derived from animal sources and not from the legumes. Meat so powdered is equal to about 4 times its weight of lean beef and to about 6½ times its own weight of ordinary meat with bone. Meat tablets made by de Louvois were unsuccessfully tried by the French in 1710.* In the Crimea, the French tried a meat powder, but with indifferent results. In 1864 "carniset" was brought out: 3 ounces of it were said to be sufficient for one meal, and equivalent to 1 lb. of meat. Parkes† reported its flavour to be disagreeable and its chemical composition defective. Then came Hassall's flour of meat, containing powdered beef, 8 per cent. of arrowroot, 2½ per cent. of sugar, with 3 per cent., of salts. This though an improvement on former attempts, was not satisfacfory. Recently Meinert has advocated Professor Hoffmann's meat powder.‡ This is made up into five different kinds of cake: that is, meat and beans: meat and rice: meat and barley: meat and flour: meat and potatoes. (Appendix XIV.)

In 100 parts this meat powder contains 73 of albumen, 7 of salts, 10 of water and 10 of hydrochloric acid. Hoffmann's meat cakes are agreeable, portable, and very easily cooked. If consumed for many days together, the digestion gets disturbed and the appetite fails. Taken with biscuits they would serve well for use as "eiserne" rations (Appendix XIV.) They have been largely used and tried in the United States Army, but not received with sufficient favour to warrant their regular issue. Erdmann's meat powder is similar to other preparations of this kind. Hemopulvine made after the method of Bert and Regnaud from blood contains 81 per cent. of albuminates, it is highly assimilable, but not to be commended. Similar to Hoffmann's is Johnson's meat powder (Appendix XIV). It makes an excellent soup, and is portable to a degree. To test its value, the writer placed himself upon the following dietary: Johnson's meat powder 2 oz. Corbin's soup 8 oz. Biscuits 12 oz. Tea ¼ oz. While on this ration, the writer for five consecutive days walked 14 miles on the flat, with a load of 60 lbs: at the end of that time the loss in body weight was but 3 lbs, and all the bodily functions normal. The value of this "emergent" ration is given in Appendix XV. Allied to the meat powders are the meat biscuits. Originally introduced by an American (Gail Borden) in 1850, many attempts to improve them have since been made. As a rule they are nothing more than meat powders mixed with flour and water. Owing to the extreme heat to which they are exposed in baking, the meat in them is usually rendered valueless. The best article of the kind is that of Scherer Kestner who by the admixture of Pepsin, really obtains the formation of a peptone.* Analogous to this of Kestner's, there exists in Germany a biscuit made by Schill, in which the water is replaced by defibrinated blood. According to Heiddlesheim and Voit this contains 26 per cent. of albuminates, and only 2·5 per cent. of fats: but beyond being highly assimilable, it is not of much use as a prepared food. Another food is "Courousa" † made by Jacquier of Nantes, and which has been tried in the Russian Army. Each ration of it weighs 12·75 oz. and is supposed to contain elements for a day's nourishment. Experience shows its qualities to be indifferent. (Appendix XIV.) In Russia under the superintendence of Professors Kittary of St. Petersburg and of Dainlenski of Kieff, three large factories for making prepared foods for the army have been established. Two in the province of Gotchetonska, where the meat and vegetables are primarily prepared, the third at Moscow where the products of the two former are mixed and made into the following six kinds of army ration. 1 Meat and oat meal: 2. Meat and barley. 3. Meat and cabbage: 4. Meat and peas: 5 Meat and mushrooms: 6. Meat and potatoes. Their nutritive values are given in Appendix XIV.

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* Colombier, De l'alimentation artificielle, et les Poudres alimentaires. Paris, 1883.

† Parkes. Army Medical Department Report for 1864.

‡ Meinert Armee und Volksernahrung. Berlin, 1880.

Their use in the Russian army is highly extolled, being issued in daily rations of 25 oz. Owing to their indigestibility, and the large quantities of cereals which they contain, it is doubtful whether these cakes would be suitable for British troops as a regular dietary, though perhaps they might be satisfactory in emergency. A preparation made by Grouvel of Paris was tried by the French Government in 1875: eleven ounces were said to afford a days aliment. Its composition was roughly 20 parts of beef, 48 parts of pea-flour, 20 parts of fat, and 12 parts of condiment. Although it appeared to be considerably superior to the German pea-sausage, yet owing to the fastidiousness of the French soldiery, and the repugnance which they displayed towards it, its further trial was abandoned.

Among this class of preparations, Pemmican deserves to take a high place. It has been extensively used in Arctic voyages, and is made of the best beef and fat rolled and dried together: sugar with raisins and and currants are sometimes added to it, and with these latter it is of undoubted high antiscorbutic value. Its analysis by Professor de Chaumont shows that in itself it offers all the elements of a true food. The objections to its use, are its expensiveness, and the disfavour with which troops regard it. On several occasions it has been tried in the army, and its many excellent qualities have always been disregarded by the men. A number of condensed soups are made by Prevet and Co. of Paris: these are thick vegetable soups, and in every way suited for use on service. Packed in tins containing 12 rations each, they are portable and readily cooked: their analysis is shewn in Appendix XIII. Of all the Prepared Foods, the army rations made by Moir and Co., of London, appear to best meet the needs of an army in the field. Existing in several varieties, and being made with fresh materials these preparations present the qualities of both fresh meat and fresh vegetables, without the saltish and peculiar spiced flavour attaching to Chicago and Australian meats.

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* Le pain de viande (Comptes rendus de l' Academie des Science) tome lxxxiv. p. 369, published in Paris, 1880.

† Leon Kirn. L'alimentation du Soldat. Paris, 1886.

Moreover they are most palatable and readily cooked. Containing as they do both meat and vegetables, they in themselves offer a large proportion of the requirements of a soldier's dietary. These remarks apply especially to rations 1, 3, 4 and 6. The others are to be less strongly recommended.

Appendix XIV. shows the nutritive value of some of these preparations. Ration No. 8 contains desiccated meat with vegetables, while No. 15 is really a brawn sausage : for many reasons they would be unsuited for a regular issue. However in the absence of fresh meat and vegetables, the writer has no hesitation in recommending the extensive employment of rations 1, 3, 4 and 6 on field service : for in them he feels convinced is to be found the best example of a Preserved and Concentrated Food now or ever made. From what has been said of Preserved, Concentrated and Prepared Foods, one is compelled to admit that the latter two classes are essentially "aliments de circonstance" and only suitable for replacing fresh animal food for a limited period. The Preserved foods are to all intents equal as aliments to the fresh articles, while their insipidity and saltness are defects which better cooking, variety and a recognition of the fact that necessity knows no law, alone can overcome. Before formulating a war ration for any given campaign, consideration should be given to the nature of the country in which it is to take place : thus, whether the area of operations be fertile and capable of supplying fresh food : or whether absolutely none such will be attainable. A primary maxim must be to live as much as possible on the products of the country in which the operations are being conducted. Failing these then provision must be made to secure independency of action and rapidity of movement to an army in the field by causing it to subsist on preserved and concentrated foods alone : which while efficient in affording aliment, are at the same time easy of transport. The next necessity is to distinguish between the "ordinary" and that which may be termed the "emergent" ration. The former should be issued on all possible occasions, care being taken that it is sufficient in quantity to meet the needs of men doing hard work, and exposed to vicissitudes. The "emergent" ration is that which every man should carry on his person if possible : or failing that sufficient of it should be always to the front and within reach, so that each man could, if need be, receive three or four days allowance of it and thereby be independent of accidents or the failure of the "ordinary" issue.

To carry more than four days food on the person is impracticable owing to the additional load imposed on the individual. The "emergent" ration should never be touched or issued except when the "ordinary" allowance is unavailable. On these principles the writer suggests the following as a war ration (ordinary) : meat 1¼ lb., if fresh with bone, or 1 lb. if preserved. Bread 1¼ lb. or Biscuit 12 oz. potatoes 8 oz. if fresh, or 2½ oz. if preserved : vegetables 8 oz. if fresh, or compressed cabbage 1½ oz., or compressed mixed vegtables 2 oz., condensed milk, sweetened, 3 oz., tinned butter 1½ oz. compressed tea ¼ oz., salt ½ oz., pepper $\frac{1}{20}$ oz. The foregoing items are each capable of being issued either as fresh articles, or in their preserved equivalents. Such a war ration (Appendix XVII.) offers the following nutritive values. Albuminates 4·6 oz., fats 3·7 oz., corbohydrates 13.7 oz. salts 1·2 oz., nitrogen 315 grains, carbon 4657 grains, potential energy 3976 foot tons. Further if the circumstances permitted and to ensure variety, which is a desideratum not only in Peace but in War, weekly issues should be made of flour 8 oz. raisins, or dried fruit 4 oz. vinegar 3 oz. and limejuice. Likewise three days a week, a tin of Erbswurst, or a concentrated soup should be given to each man. In regard to an "emergent" ration some difficulty exists particularly whether such should affordthe full amount of nourishmant required daily or not. Unfortunately to give a full ration and at the same time not to overload the men is impossible.

It is true that on a lessened diet, men would loose weight and vigour, but on such occasions when the "emergent" ration is intended to be employed, the issue resolves itself either into a moderate amount, or none all.

Appendix XV. illustrates the nutritive values of several "emergent" rations. Although imperfect diets they are capable of meeting the needs of the body for several days in the absence of better : moreover they are small in bulk and weight, portable and capable of being prepared for use within a short time. Meinert* has suggested several "emergent" rations mainly composed of Hoffmann's meat powder cakes. They however on analysis show such a marked excess of fats and corbohydrates, that their use can hardly be recommended. All "emergent" rations must be portable, durable, capable of being easily cookedand so made up that each packet is sufficient for one day and no more. It is in this latter essential that we find a difficulty in using Moir's army rations, and many other prepared and concentrated foods, as true "emergent" issues, As now met with in the market, these preparations are made up into quantities greater than one man's needs for a day. If once opened, and not soon consumed they rapidly deteriorate. Though the present size of the tins (2 lbs. or more) is satisfactory for general use and issue, the writer would advise the manufacture of Moir's rations, into smaller quantities, say 10 or 12 oz. tins, these latter to be specially reserved for, and issued only as parts of an "emergent" ration. Each tin would then be enough for one man during one day, and serve as the "emergent" ration daily unit.

(See Rations 13, 14, 15, 16, 17 and 18 in Appendix XV.) Of the other rations given in Appendix XV. Nos. 1, 3, 4, 9, 10, 11 and 12 already exist as portable and compact preparations, it being taken for granted that the biscuits should remain separate and carried free as such. In regard to Nos. 2, 5, 6, 7 and 8, several firms have assured the author of the feasibility of combining the various elements (excepting biscuits) of those rations together into a single, portable and durable packet.†

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* Meinert. Armée und Volksernahrung. Berlin 1880.

† The patent glazed paper invented by L. H Thomas of Chicago, and used by him in the manufacture of paper bottles. offers itself as an excellent material wherewith to cover and contain "emergent" rations in a single packet. This paper is cheap, light and not easily damaged. Messrs. Tulk and Co., 37 Walbrook E. C. are the London agents.

It may not be out of place, to here refer to the fact, that in the event of these products of a high civilization not being available for a campaign during emergencies (say for instance in Central Asia) recourse might be had to certain grains found very abundantly in India. Such grains are the lablab bean,* soy bean,† mung bean,‡ bajra || and rice. These with ghi, or butter and salt, made into "chupatties" are capable of affording an aliment in emergencies which Europeans as yet inadequately recognize. It may be objected that these pulses are not assimilable by British troops: such is a mistaken idea: the author has frequently subsisted on such alone when doing great physical exertion: better have chuppatties than no food at all. The writer would suggest that the annual course of so called "military training" as now carried out by "companies" and "troops" once a year, should be made to include the subsistence, during the month's training upon a war ration, inclusive of 8 to 10 days upon an "emergent" issue: accompanied by forced marches and other extra exertions. Appendix XVIII. illustrates the results of an experiment carried out by the author upon himself and eight men of a regiment serving in India, with a view to test the sustaining capabilities of certain dietaries. If attention were only directed to the real conditions of war during the annual training (one month) of companies, not only would the officers and men become familiar with war dietaries, but they would all then recognize the fact that there are times on service when one must be content with what one can get. The nutritive values of several suggested grain made "emergent" rations are given in Appendix XV.

Such are the main facts bearing on the relations between the food and work of the soldier in the various conditions under which he serves. The conclusions arrived at, and the proposals made to remedy the defects may be summed up as follows: —

1.—That the ration at home offers an insufficiency of albuminates and fats, with an excess of carbohydrates. Although the relation between the food and work of the British soldier at home is not very greatly out of proportion, yet taking into consideration the very large number of young and immature men in the ranks of the home battalions, it would be advisable to improve the ration, in the following manner. Firstly to meet the deficiencies of albuminates and fats, by an additional issue of meat with allowances of butter and cheese: Secondly to remedy the excess of carbohydrates by a reduction in the quantities of bread and potatoes. Further that the present need of a regular evening meal, and the present unequal distribution of the dietary over the whole day are grave defects which could most efficiently and economically be remedied by the alteration of the present dinner hour from midday to the early evening.

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* Lablab bean is the *Dolichos lablab* of Linnæus: *Pertab Sing* in Hindustani: *Bunsim* in Bengali and *Mutchah* in Tamil.

† Soy bean is the *Dolichos soja* of Linnaus: *Bhat* in Hindustani; *Bhut* in Punjabi: *Gari kulay* in Bengali.

‡ Mung bean is the *Phaseolus Mungo: Urd* or *Mash* in Punjabi: *Mush-kulay* in Bengali: also called *Pessalu* in Madras.

|| Bajra is a millet and the *Pemisetum typhoideum: Bajra* in Hindustani; *Cumbu* in Tamil.

2.—That the ration on boardship is in the main satisfactory, though improvements in it could be made by slightly reducing the meat issue, and allowing sweetened condensed milk with the tea given at the morning and evening meals.

3.—In consequence of the same defects being apparent in the Colonies as at home, it is suggested to grant the same ration as that proposed for issue at home : also to change the meal hours, making the dinner an evening meal in place of a midday one as at present.

4.—In India, though the disproportion between the food and work of the British soldier is not very marked, yet certain grave faults in the diet are notable. The chief faults are the glaring deficiency of vegetable food, and the absence of fats. To meet these defects, it is proposed not to change the meat allowance, but to largely increase and render compulsory the vegetable issue, accompanied by small allowances of oatmeal and butter The present rice issue might be discontinued and the allowance of potatoes be slightly reduced. Moreover the hour for dinner should be changed as suggested for home and the Colonies.

5.—That in war, the occurrence of Scurvy and allied diseases can be best avoided by the issue of sufficient and varied a ration as possible. Also it is proposed to secure mobility to the troops, and independency of convoys by an extensive employment of preserved food : at the same time ensuring the issue of an "emergent" ration by the issue and use of one or more of the Prepared and Concentrated foods.

It is to be hoped that Government may be able to carry out some if not all the suggestions proposed : several of which have for years been advocated by various medical officers. It must be remembered that "as the workman, so the tool" and that to preserve the men in health, to develop their vigour for the wars of the future, and to secure their existence in the field by the issue of a good and sufficient ration is quite as important as the perfection of warlike means of destruction and defence. Man is always the first instrument of war, and those who try to strengthen him and feed him, labour equally in the country's defence as they who drill and lead battalions to fight. The first duty imposed by Nature upon Humanity is the preservation of existence : that this essay may be accepted as an honest, though perhaps an indifferent effort to secure that end for the British soldier is the earnest wish of the author.

APPENDIX.

In the following tables are given certain facts concerning the nutritive value of foods and diets which could not be conveniently incorporated in the text of the preceding essay.

I.

This table illustrates the wants of man, as judged by an examination of class dietaries and of excreta.

	Nitrogenous Matter.		Carboniferous Matter.		Nitrogen.		Carbon.	
	grammes.	ounces.	grammes.	ounces.	grammes.	grains.	grammes.	grains.
Idleness.								
Dietaries	76·66	2·67	555·64	19·64	11·66	180	147·25	3816
Excreta	78·78	2·78	612·14	21·6	12·61	187	272·06	4199
Average ...	77·22	2·73	583·89	20·6	11·88	184	209·6	4005
Ordinary Labour.								
Dietaries	129·23	4·56	828·26	29·24	19·89	307	368·5	5688
Excreta	124·39	4·39	689·67	23·63	19·18	296	304·1	4694
Average ...	126·21	4·48	759·96	26·44	19·53	302	336·3	5191

ENT.

Appen	Standard War Ration. (Dr. Chaumont.)		Proposed War Ration.	
	Water Free.	Ratio Alb. 1.	Water Free.	Ratio Alb. 1.
	oz		oz	
Albuminate	5·75	1·	4·604	1·
Fats ...	2·2	·38	3·735	·7
Carbohydra	15·76	2·7	13·5	2·6
Salts ...	1·3	·4	1·23	·3
Tot	25·01	*	23·069	*
	grains		grains	
Nitrogen	380	N : C :: 1 : 13	315	N : C :: 1 : 14
Carbon	5000		4657	
Salts...	516		536	
Potential fro	Foot Tons.	Ratio to Total.	Foot Tons.	Ratio to Total.
Albuminates	994	25·	800	20
Fats ...	831	21·	1341	33
Carbohydrat	2166	54·	1835	47
Tot	3991	100	3976	100

TEXT.

Append	Standard War Ration. (Dr. Chaumont.)		Proposed War Ration.	
	Water Free.	Ratio Alb. 1.	Water Free.	Ratio Alb. 1.
	oz		oz	
Albuminate	5·75	1·	4·604	1·
Fats ...	2·2	·38	3·735	·7
Carbohydra	15·76	2·7	13·5	2·6
Salts ...	1·3	·4	1·23	·3
Tot	25·01	*	23·069	*
	grains	N : C : : 1 : 15	grains	N : C : : 1 : 14
Nitrogen	380		315	
Carbon	5000		4657	
Salts ...	546		536	
Potential fron	Foot Tons.	Ratio to Total.	Foot Tons.	Ratio to Total.
Albuminates	994	25·	800	20
Fats ...	831	21·	1341	33
Carbohydrate	2166	54·	1835	47
Tota	3991	100	3976	100

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III.—PEACE RATIONS IN SOME CONTINENTAL ARMIES.

	Water Free Food.	Albuminates.	Fats.	Carbohydrates.	Salts.	Nitrogen.	Carbon.	Potential Energy.
	oz	oz	oz	oz	oz	grains	grains	f. tons.
Russian...	34·3	5·8	1·	25·	2·5	400	6415	4831
Italian	26·5	4·1	1·5	20·	·9	282	5290	4000
Turkish...	25·7	4·	1·75	19·	1·	276	5142	3900
Belgian...	26·3	4·3	·9	20·	1·2	296	5090	3850
French	24·14	4 3	1·25	18·04	1·1	298	4821	3710
Prussian	24·8	4.8	1·1	17·4	1·5	331	4761	3700
English...	23 3	3·95	1·35	17·08	·95	272	4611	3614
Austrian	23·3	3·7	1·6	17·	1·	252	4619	3560
Spanish...	21·47	3 4	·87	16·	1.2	234	4116	3346
American	25·55	4·6	1·75	13·5	1·7	317	4100	3300
Dutch	20·6	4·4	1·6	12·9	1·7	303	3471	3213

	alts.	Nitrogen.	Carbon.	Potential Energy.
	z	grains	grains	f. tons
Sunday ...	·88	427	4186	3410
Monday ...	·71	386	4674	3447
Tuesday ...	·82	428	4730	3890
Wednesday ...	·77	353	3400	2700
Thursday ...	·85	350	4535	3542
Friday ...	·78	450	4417	3554
Saturday ...	·75	353	3500	2860
	·94	341	4195	3345

Energy.
ons
94
65
387
90
342
132
314
...
...
...
[illegible]

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VI.—PROPOSED RATION FOR INDIA.

Appendix VI.	Gross Weight.	Water free.	Albuminates.	Fats.	Carbohydrates.	Salts.	Nitrogen.	Carbon.	Potential Energy.
	oz	oz	oz	oz	oz	oz	grains	grains	f. tons
Meat with Bone ...	16·	3·2	1·92	1·08	...	·2	132	782	694
Bread	20·	12·	1·6	·3	9·8	·25	110	2320	1865
Potatoes	12·	2·9	·24	·015	2·52	·12	16·5	540	387
Vegetables	8·	·7	·14	·04	·41	·06	9·6	136	90
Butter	1·	·9	·003	·91	...	·03	·2	312	342
Oatmeal or Soojie ...	1·	·83	·12	·05	·63	·03	8·7	168	132
Sugar	2·5	2·42	...	...	2·41	·012	...	445	314
Salt	·66	·66	...	...	...	·66	...	...	...
Tea or	·7	·7	...	...	...	...	...	...	...
Coffee	·33	·33	...	...	...	...	...	...	...
							277		

26·59

32·6

20·9

IX.—TA

Appendix IX.

Fresh meat or ...
Salt ,, or ...
Corned ,, or ...
Bacon or Pork ...
Cheese ... ...
Biscuits ... ...
Flour ... ...
Rice ... ...
Fresh Potatoes or
Preserved potatoes
Fresh Vegetable or
Preserved ,,
Butter ... ...
Jam or Marmalade
Tea or Coffee ...
Cocoa and Milk ...
Sugar ... ...
Lime Juice ...
Vinegar ... ...
Salt ... ...
Pepper ... ...
Erbswurst ...
Rum ... ..

Albuminates ...
Fats ... ...
Carbohydrates ...
Salts ... ...

Total Water Free Foo

Nitrogen in grains
Carbon ,, ,,

N : C as ... ...

Potential Energy

Total water free food.
oz.
20·
20·7
22·15
22·95
33·54
30·9
32·65
28·4
28·7
26·4
24·9
32·2
33·7
25·2
28·9
21·1
22·
26·32
26·59
32·6
20·9

X.—TABLE SHOWING THE VALUE OF THE WAR RATION IN FOREIGN ARMIES.

	Raw Meat.	Bread or Biscuit.	Albuminates	Fats.	Carbohydrates.	Salts.	Total water free food.
	oz.	oz.	oz.	oz.	oz.	oz.	oz.
GERMAN ARMY.							
1. Meat + Bread	13·4	27·5	4·7	1·25	13 25	·8	20·
2. „ Biscuit	13·4	17·8	5·4	1·25	13·25	·8	20·7
3. Bacon + Bread	6·	27·5	2·7	5·2	13·25	1·	22·15
4. „ Biscuit ...	6·	17·8	3·5	5·2	13·25	1·	22·95
5. Extraordinary	17·8	35·6	6·8	1·4	24·24	1·1	33·54
AUSTRIAN ARMY.							
1. With Meat	10·	29·	5·2	1·6	23·1	1·	30·9
2. „ Bacon	16·1	35·	3·9	4·9	23·1	·75	32·65
FRENCH ARMY.							
1. With Bread	11·1	35·6	4·8	1·1	21·4	1·1	28·4
2. „ Biscuit	11·1	27·5	6·	1·1	20·5	1.1	28·7
UNITED STATES.							
1. With Bread ...	20·	22·	5·7	1·5	17·5	1·7	26·4
2. „ Biscuit ...	20·	16·	5·1	1·7	16·4	1·7	24·9
3. „ Flour ...	20·	22·	6·3	1·5	22·7	1.7	32·2
Russian Army	7·3	43·5	5·2	1·	25·	2·5	33·7
Turkish „	8·5	34·4	4·	1·6	18·5	1·1	25·2
Italian „	10·7	32·7	4 5	1·6	21·8	1·	28·9
SPANISH.							
1. With Meat ...	8·9	25·	3·3	·8	15·9	1·1	21·1
2 „ Bacon ...	3·6	25·	2·	3·	15·9	1·1	22·
3. „ Stock fish...	8·9	25·	8·9	·32	15·9	1·2	26·32
Belgian Army	8·9	25·	4·3	·89	20·3	1·1	26·59
Dutch „	18·5	26 7	4·4	1·6	25·	1·6	32·6
Swiss „	17·8	26·7	4·4	1·8	13·2	1·5	20·9

XI.

Table XI.	Water.	Casein or Albumen.	Fats.	Milk Sugar.	Ash.
	oz.	oz.	oz.	oz.	oz.
Cows Milk	87·55	3·41	3·64	4·69	1·71
Condensed Milk with Sugar ...	24·4	10·3	9·2	54·2	1·9
Condensed Milk without Sugar,	47·5	17·8	15·6	2·5	16·
Preserved American Cheese ...	22·5	38·1	35·4	...	4·
„ Dunlop „ ...	38·4	25·8	31·9	...	3·9
„ Cheddar „ ...	27·8	44·5	24·	...	3·7

Preserved Potato.

Water	12·17
Dry Vegetable matter ...	83·57
„ Mineral „ ...	4·26
	100·

Fresh Potato.

Water	75·
Dry Vegetable matter ...	24·1
„ Mineral „ ...	·9
	100·

Compressed mixed Vegetables.

Water	15·61
Dry Vegetable matter ...	80·29
„ Mineral „ ...	4·1
	100·

Fresh mixed Vegetables.

Water	85·
Dry Vegetable matter ...	14·3
„ Mineral „ ...	·7
	100·

Compressed dried Cabbage.

Water	19·93
Dry Vegetable matter ...	74·18
„ Mineral „ ...	5·89
	100·

Fresh Cabbage.

Water	89·
Dry Vegetable matter ...	9·8
„ Mineral	1·2
	100·

Preserved Carrots.

Water	89·13
Dry Vegetable matter ...	10·21
„ Mineral „ ...	·66
	100·

Fresh Carrots.

Water	85·
Dry Vegetable matter ...	14·
„ Mineral „ ...	1·
	100·

XII.—TABLE SHEWING THE VALUE OF SOME "MEAT EXTRACTS."—

Compiled from original investigations made by the author.

Appendix XII.	Moisture.	Mineral Matter.	Phosphoric Acid.	Precipitate by 60 per cent. alcohol in 2 hours.	Percentage of Phosphoric Acid in Ash.	Meat Value, Liebig being 100.
Liebig's Extract of Beef	17·15	23·48	5·88	4·32	23·77	100
"Ramorine" Brand of Liebig's Extract	19·1	23·1	5·2	5·1	19·6	95
Kemmerich's Extract of Beef ...	20·6	18·5	3·	3·9	20·1	80
Gillat's Extract of Beef	18·4	10.6	4·21	6·33	18·5	80
Savory and Moore's Fluid Beef ...	26·	12·15	4·1	7·	17·9	80
Brand's Extract of Beef	24·5	4.8	2·6	8·72	20·3	80
Mason's Essence of Beef	27·1	6·	3·5	3.92	28·1	72
Lion Essence of Beef.	27·8	4·9	3·9	7·7	19·52	70
Johnson's Fluid Beef...	27·5	7·2	4·1	8·1	23·79	70
Cybil's Extract of Beef	23·1	4·5	4·4	4·7	23·8	70
Kreochyle Co's. Liquid Meat... ...	28·7	3·9	2.9	4·1	17·4	65
Valentines Meat Juice.	22·9	7·6	3·1	6.32	22·6	65
Murdock's Liquid Food	25·1	3·1	2·9	5·3	23·	65

X.—TABLE SHOWING THE VALUE OF THE WAR RATION IN FOREIGN ARMIES.

	Raw Meat.	Bread or Biscuit.	Albuminates	Fats.	Carbohydrates.	Salts.	Total water free food.
	oz.	oz.	oz.	oz.	oz.	oz.	oz.
GERMAN ARMY.							
1 Meat + Bread	13·4	27·5	4·7	1·25	13 25	·8	20·
2. „ Biscuit	13·4	17·8	5·4	1·25	13·25	·8	20·7
3. Bacon + Bread	6·	27·5	2·7	5·2	13·25	1·	22·15
4. „ Biscuit ...	6·	17·8	3·5	5·2	13·25	1·	22·95
5. Extraordinary	17·8	35·6	6·8	1·4	24·24	1·1	33·54
AUSTRIAN ARMY.							
1. With Meat	10·	29·	5·2	1·6	23·1	1·	30·9
2. „ Bacon	16·1	35·	3·9	4·9	23·1	·75	32·65
FRENCH ARMY.							
1. With Bread	11·1	35·6	4·8	1·1	21·4	1·1	28·4
2. „ Biscuit	11·1	27·5	6·	1·1	20·5	1.1	28·7
UNITED STATES.							
1. With Bread ...	20·	22·	5·7	1·5	17·5	1·7	26·4
2. „ Biscuit ...	20·	16·	5 1	1·7	16·4	1·7	24·9
3. „ Flour ...	20·	22·	6·3	1·5	22·7	1.7	32 2
Russian Army	7·3	43·5	5·2	1·	25·	2 5	33 7
Turkish „	8·5	34·4	4·	1·6	18·5	1 1	[illegible]
Italian „	10·7	32·7	4 5	1 6	21·8	1	[illegible]
SPANISH.							
1. With Meat ...	8·9	25·	3 3	·8	[illegible]	[illegible]	[illegible]
2 „ Bacon ...	3·6	25·	[illegible]	3	[illegible]		[illegible]
3. „ Stock fish...	8·9	25·	8 9	·32	[illegible]	[illegible]	[illegible]
Belgian Army	8 9	25·	4 3	[illegible]	[illegible]	[illegible]	[illegible]
Dutch „	18·5	26 7	4 1	[illegible]	[illegible]	[illegible]	[illegible]
Swiss „	17·8	26 7	4 1	[illegible]		[illegible]	[illegible]

XIII.—TABLE SHEWING THE COMPOSITION OF SOME CONCENTRATED SOUPS. —(*After Stutzer*)

Appendix XIII.	Water per cent.	Organic substance per cent.	Mineral substances per cent.	Extraction substance per cent.	Digestible Albumen in Organic Matter.	Digestible Peptones in Organic Matter.	Total per cent. Value of Albuminates.
Carurick's Beef Peptonoids ...	6·76	37 67	55 5	·1	56·62	6·93	63 55
Johnson's Fluid Beef... ...	49·49	44 02	5 19	1 3	17 65	17·73	35 38
Kemmerich's Extract of Beef..	20·95	54 65	18 24	6·16	7 86	14 24	22·1
Murdoch's Liquid Food ...	83·61	15 7	·56	·13	12 91	·23	13 14
Brand's Essence of Beef ...	89·19	9 35	1 31	·15	2 91	6·41	9 32
Savory and Moore's Fluid Beef	27·01	53·42	12 10	7 47	3 12	5 89	9 01
Brand's Beef Tea	60·9	34 1	1 5	3 5	5 91	2 99	8 9
Benger's Peptonized Beef Jelly	89·69	5 81	88	3 62	2 91	5·9	8 81
Liebig's Extract of Beef ...	19·33	49 74	23·15	7·78	4 83	3·4	8 23
Kreochyle Co.'s Liquid Meat...	81·2	15 3	1 4	2 1	1 6	6·51	8 11
Valentine's Meat Juice ...	59·07	27 93	11 52	1 48	5 02	2·96	7 98
Lion Compy's. Essence of Beef	87·41	9 29	1·2	2 1	1·81	6·1	7 91
Ditto Concd. Beef Tea...	38·92	38 19	18 57	4 32	2·61	4·95	7 56
Kopf's Concentrated Soup ...	39·11	35 43	22 45	3 01	3·14	4·42	7 56
Whitehead's ditto ...	41·3	38 81	18 1	1 79	5 31	2·09	7 4
Brand's Chicken Peptone ...	53·1	40 88	5 2	·82	2·72	4·38	7 1
Mason's Essence of Beef ...	57·1	35 27	5 6	2 63	3 1	4·	7·1
Bellat's Extract of Meat ...	17·1	75 3	5·3	2·3	3 7	3·2	6 9
Cybil's Fluid Extract of Beef..	88·3	5 9	3·4	2·4	2·7	4·8	7 5
Ramorine Brand of Liebig's Extract of Beef	28·55	43 8	25 15	2·5	3·2	1·6	4·8
Prevet & Co.'s Concd. Pea Soup	32·	38 2	28 4	1·4	3 06	·96	4 02
Ditto Lentil ,,...	33·5	34·4	30·	2·1	5·7	1·8	7 5
Ditto Haricot ,,...	37·2	34 8	27 1	1 9	5 6	1·2	6·8
Ditto Julienne ,,...	40 3	26·7	30·	3·	3 7	·9	4·6
Ditto Sorrel ,,...	39·	27 5	31·	2 5	3 5	1·	4·5

XII.—TABLE SHEWING THE VALUE OF SOME "MEAT EXTRACTS."—

Compiled from original investigations made by the author.

Appendix XII.	Moisture.	Mineral Matter.	Phospporic Acid.	Precipitate by 60 per cent. alcohol in 2 hours.	Percentage of Phosphoric Acid in Ash.	**Meat Value, Liebig being 100.**
Liebig's Extract of Beef	17·15	23·48	5·88	4·32	23·77	100
Ramorine" Brand of Liebig's Extract	19·1	23·1	5·2	5·1	19·6	95
emmerich's Extract of Beef ...	20·6	18·5	3·	3·9	20·1	80
illat's Extract of Beef	18·4	10.6	4·21	6·33	18·5	80
Savory and Moore's Fluid Beef ...	26·	12·15	4·1	7·	17·9	80
Brand's Extract of Beef	24·5	4.8	2·6	8·72	20·3	80
Mason's Essence of Beef	27·1	6·	3·5	3.92	28·1	72
Lion Essence of Beef.	27·8	4·9	3·9	7·7	19·52	70
Johnson's Fluid Beef...	27·5	7·2	4·1	8·1	23·79	70
Cybil's Extract of Beef	23·1	4·5	4·4	4·7	23·8	70
Kreochyle Co's. Liquid Meat... ...	28·7	3·9	2.9	4·1	17·4	65
Valentines Meat Juice.	22·9	7·6	3·1	6.32	22·6	65
Murdock's Liquid Food	25·4	3·1	2·9	5·3	23·	65

XIII.—TABLE SHEWING THE COMPOSITION OF SOME CONCENTRATED SOUPS. —(*After Stutzer*)

Appendix XIII.	Water per cent.	Organic substance per cent.	Mineral substances per cent.	Extraction substance per cent.	Digestible Albumen in Organic Matter.	Digestible Peptones in Organic Matter.	Total per cent. Value of Albuminates.
Carurick's Beef Peptonoids ...	6·76	37 67	55 5	·1	56·62	6·93	63 55
Johnson's Fluid Beef... ...	49·49	44 02	5 19	1 3	17 65	17·73	35 38
Kemmerich's Extract of Beef..	20·95	54 65	18 24	6·16	7 86	14 24	22 1
Murdoch's Liquid Food ...	83·61	15 7	·56	·13	12 91	·23	13 14
Brand's Essence of Beef ...	89·19	9 35	1 31	·15	2 91	6·41	9 32
Savory and Moore's Fluid Beef	27·01	53·42	12·10	7 47	3 12	5 89	9 01
Brand's Beef Tea	60·9	34 1	1·5	3 5	5 91	2 99	8 9
Benger's Peptonized Beef Jelly	89·69	5 81	88	3 62	2 91	5·9	8 81
Liebig's Extract of Beef ...	19·33	49 74	23·15	7·78	4 83	3·4	8 23
Kreochyle Co.'s Liquid Meat...	81·2	15 3	1 4	2 1	1 6	6·51	8 11
Valentine's Meat Juice ...	59·07	27 93	11 52	1 48	5 02	2·96	7 98
Lion Compy's. Essence of Beef	87·41	9 29	1·2	2 1	1·81	6·1	7 91
Ditto Concd. Beef Tea...	38·92	38 19	18 57	4 32	2·61	4·95	7 56
Kopf's Concentrated Soup ...	39·11	35 43	22 45	3 01	3·14	4·42	7 56
Whitehead's ditto ...	41·3	38 81	18 1	1 79	5 31	2·09	7 4
Brand's Chicken Peptone ...	53·1	40 88	5 2	·82	2·72	4·38	7 1
Mason's Essence of Beef ...	57·1	35 27	5 6	2 63	3 1	4·	7·1
Bellat's Extract of Meat ...	17·1	75 3	5·3	2·3	3 7	3·2	6 9
Cybil's Fluid Extract of Beef..	88·3	5 9	3·4	2·4	2·7	4·8	7·5
Ramorine Brand of Liebig's Extract of Beef	28·55	43 8	25 15	2·5	3·2	1·6	4·8
Prevet & Co.'s Concd. Pea Soup	32·	38 2	28 4	1·4	3 06	·96	4 02
Ditto Lentil „...	33·5	34·4	30·	2·1	5·7	1·8	7 5
Ditto Haricot „...	37·2	34·8	27 1	1 9	5 6	1·2	6·8
Ditto Julienne „...	40 3	26·7	30·	3·	3 7	·9	4·6
Ditto Sorrel „...	39·	27 5	31·	2·5	3·5	1·	4·5

Appendix XVI.

Having established in himself a condition of nitrogenous equilibrium and finding his daily out-put of Nitrogen to be constant, that is averaging 291 grains, and the body weight to be 155 lbs. the following effects upon nutrition were observed when subsisting on 8 ounces of Corbin's Soup and and 12 oz of Biscuit per diem by the writer. (see folio 52 of the preceding essay).

Nature of the Work done daily.	Value of the work done in Foot tons.	Nitrogen eliminated in Grains.	Body weight in pounds.	Remarks.
1st day.—Walked 10 miles on flat carrying 60 lbs. in addition to usual duties	256·	295·	155·	
2nd day.—Played a games of Polo. Walked 7 miles carrying 60 lbs. Usual duties.	202·	287·	153¾	Feel very hungry.
3rd day.—Walked 8 miles carrying 60 lbs. played 3 sets of single tennis. Usual duties	215.	275·	152·	Hungry with a sinking pain in epigastrium.
4th day.—Walked 12 miles carrying 60 lbs. also performed usual duties	300·	281·	157½	No hunger. Slight diarhœa.
5th day.—Walked 10 miles, carrying 60 lbs. Performed usual duties	256·	270·	152¼	Distaste for food. Acid dyspepsia.
6th day.—Walked 8 miles carrying a rifle. Performed usual duties ...	200·	263·	152¾	Feel much better.
7th day.—Walked 7½ miles carrying 60 lbs. Performed usual duties	170·	258·	151¾	Hungry but no relish for diet.

XV.—TABLE SHOWING THE VALUE OF SOME SUGGESTED "EMERGENT" RATIONS.

APPENDIX XV.	Gross Weight,	Albuminates,	Fats.	Carbohydrates.	Salts.	Nitrogen.	Carbon.	Potential Energy.
1.	oz.	oz.	oz.	oz.	oz.	grains	grains	f. tons
Erbswurst	4·	·65	·96	2·38	·08	45·	907	904
Biscuit	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3860	[illegible]
Moir's No. 15 Ration	10·	2·73	1·46	4·	·57	185	1810	1548
Biscuits	12·	1·87	·156	8·8	·16	129·	2160	2268
19.	22·	4·6	1·616	12·8	·73	314·	3970	3816
Lablab Beans	9·	2·016	·03	5·16	·6	140·	1204	1246
Rice	12·	·876	·09	9 66	·09	42·	2500	1400
Oil, Ghi or Butter	1·	·003	·91	...	·03	·2	312	342
20.	22·	2·895	1·03	14·82	·72	184·2	3616	3088
Mung Beans...	7·	1·587	·06	4·27	·11	130·	1118	1243
Bajra...	13·	1·352	...	10 18	·04	80·	2180	1613
Oil, Ghi or Butter	1·	·003	·91	...	·03	·2	312	342
21.	21·	2·942	·97	14·45	·18	210·2	3610	3198
Soy Beans	6·5	2·29	·04	4·5	·1	140·	1250	956
Bajra	13·5	1·4	...	10·57	·05	80·	2200	1618
Oil, Ghi or Butter...	1·	·003	·91	..	·03	·2	312	342
22.	21·	3·693	·95	15·07	·18	220·2	3762	2946
Soy Beans	5·5	1·94	·02	3·817	·09	135·	1060	906
Rice	14·5	·95	·09	11·552	1·1	50·	2380	1700
Oil, Ghi or Butter...	1·	003	·91	...	·03	·2	312	342
	21·	2·893	1·02	15·369	1·22	185·2	3752	2918

XV.—TABLE SHOWING THE VALUE OF SOME SUGGESTED "EMERGENT" RATIONS.

APPENDIX XV.	Gross Weight,	Albuminates,	Fats.	Carbohydrates.	Salts.	Nitrogen.	Carbon.	Potential Energy.
1.	oz.	oz.	oz.	oz.	oz.	grains	grains	f. tons
Erbswurst	4·	·65	·96	2·38	·08	45·	907	904
Moir's No. 15 Ration	10·	2·73	1·46	4·	·57	185	1810	1548
Biscuits	12·	1·87	·156	8·8	·16	129·	2160	2268
19.	22·	4·6	1·616	12·8	·73	314·	3970	3816
Lablab Beans	9·	2·016	·03	5·16	·6	140·	1204	1246
Rice	12·	·876	·09	9·66	·09	42·	2500	1400
Oil, Ghi or Butter	1·	·003	·91	...	·03	·2	312	342
20.	22·	2·895	1·03	14·82	·72	184·2	3616	3088
Mung Beans...	7·	1·587	·06	4·27	·11	130·	1118	1243
Bajra	13·	1·352	...	10·18	·04	80·	2180	1613
Oil, Ghi or Butter ...	1·	·003	·91	...	·03	·2	312	342
[illegible]	[illegible]	[illegible]	·97	14·45	·18	210·2	3610	3198
[illegible]	[illegible]	[illegible]	·04	4·5	·1	140·	1250	956
[illegible]	[illegible]	[illegible]	...	10·57	·05	80·	2200	1648
[illegible]	[illegible]	[illegible]	·91	..	·03	·2	312	312
[illegible]	[illegible]	[illegible]	·95	15·07	·18	220·2	3762	2946
[illegible]	[illegible]	[illegible]	·02	3·817	·09	135·	1060	906
[illegible]	[illegible]	[illegible]	·09	11·552	1·1	50·	2380	1700
[illegible]	[illegible]	[illegible]	·91	...	·03	·2	312	342
[illegible]	[illegible]	2·893	1·02	15·369	1·22	185·2	3752	2948

Appendix XVI.

Having established in himself a condition of nitrogenous equilibrium and finding his daily out-put of Nitrogen to be constant, that is averaging 291 grains, and the body weight to be 155 lbs. the following effects upon nutrition were observed when subsisting on 8 ounces of Corbin's Soup and and 12 oz of Biscuit per diem by the writer. (see folio 52 of the preceding essay).

Nature of the Work done daily.	Value of the work done in Foot tons.	Nitrogen eliminated in Grains.	Body weight in pounds.	Remarks.
1st day.—Walked 10 miles on flat carrying 60 lbs. in addition to usual duties	256·	295·	155·	
2nd day.—Played a games of Polo. Walked 7 miles carrying 60 lbs. Usual duties.	202·	287·	153¾	Feel very hungry.
3rd day.—Walked 8 miles carrying 60 lbs. played 3 sets of single tennis. Usual duties	215.	275·	152·	Hungry with a sinking pain in epigastrium.
4th day.—Walked 12 miles carrying 60 lbs. also performed usual duties	300·	281·	157½	No hunger. Slight diarhœa.
5th day.—Walked 10 miles, carrying 60 lbs. Performed usual duties	256·	270·	152¼	Distaste for food. Acid dyspepsia.
6th day.—Walked 8 miles carrying a rifle. Performed usual duties ...	200·	263·	152¾	Feel much better.
7th day.—Walked 7½ miles carrying 60 lbs. Performed usual duties	170·	258·	151¾	Hungry but no relish for diet.

ıfantry regiment serving in India. The men were entirely
h. For three weeks immediately preceding the commence-
ıent began, the mean daily out-put of Nitrogen by each
ın. The general result is of both interest and value, as

ly Elimination of gen, per man.	REMARKS.
... 249 grains	The kit taken was rather more than that usually carried in India, but consisted of absolute necessaries. The meat was carried cut up in rations in the canteens, and cooked as a stew with Potatoes. Each man carried his 5 days "emergent" ration as required for 3rd period. One man fell out on 5 day and did not proceed, no other complaints. No ex'ra allowed to be purchased, no beer or spirits. The seventh day was a halt
... 248 ,,	
... 251 ,,	
... 250 ,,	
... 253 ,,	
... 249 ,,	
... 253 ,,	
... 267 ,,	
... 260 ,,	
.. 260 ,,	

Elimination of gen, per man.	REMARKS.
... 259 grains	Conditions as above, except that the tin of Moir's ration which sufficed for each three men, was carried by each man alternately. One man had ague on 2nd day, but was able to go on next day. The fourth day was a halt. If the ordinary days route was less than 14 miles, the
... 260 ,,	
... 273 ,,	
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fantry regiment serving in India. The men were entirely h. For three weeks immediately preceding the commence- ent began, the mean daily out-put of Nitrogen by each n. The general result is of both interest and value, as

ly Elimination of gen, per man.	REMARKS.
... 249 grains	The kit taken was rather more than that usually carried in India, but consisted of absolute necessaries. The meat was carried cut up in rations in the canteens, and cooked as a stew with Potatoes. Each man carried his 5 days "emergent" ration as required for 3rd period. One man fell out on 5 day and did not proceed, no other complaints. No extra allowed to be purchased, no beer or spirits. The seventh day was a halt
... 248 "	
... 251 "	
... 250 "	
... 253 "	
... 249 "	
... 253 "	
... 267 "	
... 260 "	
.. 260 "	

Elimination of gen, per man.	REMARKS.
... 259 grains	Conditions as above, except that the tin of Moir's ration which sufficed for each three men, was carried by each man alternately. One man had ague on 2nd day, but was able to go on next day. The fourth day was a halt. If the ordinary days route was less than 14 miles, the
... 260 "	
... 273 "	
... 278 "	
... 290 "	
... 293 "	
... 293 "	
... 304 "	

LETTERS ON STRATEGY.

LETTER 3.

French dispositions from the 8th to the 13th October.

On the 8th October the first contact of the two armies took place. The cavalry marching in front of the French left column drove in the Prussian forepost at Coburg, and at Saalfeld and Gefell the foremost troops of Murat and Tanentzien came into collision.

From the moment of first contact with the enemy Strategy enters another phase. On one side it gives rise to tactical events, on the other side these tactical events react upon it again. It must leave the domain of pure speculation It passes to a certain extent into that of reality. At this point even the Strategy of the last century was compelled to reckon no longer with geographical points, holding of territory &c. alone. It was obliged to turn its attention to the enemy himself.

October 9th.—Even Napoleon's dispositions were influenced by contact with the enemy. He certainly let his masses resume the advance on the 9th October in the direction they had been taking heretofore. The right wing column pushed its head on to Hof (3 miles distant,) the middle column just beyond Schleiz (4 miles,) the left up to Gräfenthal (4 miles.)

None the less, the circumstance that Tanentzien, who was opposite his middle column, developed no important force, and was obliged at Schleiz to give way in spite of a tough resistance, as soon as Murat and Bernadotte made their main bodies felt, and the former universal report of spies that the Prussian army stood in the neighbourhood of Erfurt, inspired Napoleon with anxiety for his left column. The Emperor himself came to-day to Ebersdorf. He may perhaps now first have obtained a knowledge of the nature of the Saale, which has a deep channel and the passages of which form very arduous defiles. I cannot refrain from thinking that the destruction of Mortier's Corps at Dürrenstein may have been still very fresh in his memory. For it was not a year ago that this Corps separated from the army by the Danube, detached in like manner on the left flank, had fallen into a trap. If all the French Army Corps went on in the same direction on the 10th October, the left column on that day would be separated from the army by the Saale, and if the Prussian army united fell upon it, a like fate might be in store for it, such as befell Mortier in 1805. On this account Napoleon recommended the greatest prudence to Marshal Lannes, who marched at the head of the left column, when he moved on the 10th Octobet from Gräfenthal upon Saalfeld.

Certainly Angereau was to have followed Marshal Lannes by only half a day's march distance, and one would think that both together, being 46,000 men strong, might have been able to offer to the greatest superiority of numbers a resistance of the duration of at least one day.

But Napoleon knew from experience very well, that although the marches were so directed that the hinder Corps spent the night only half a day's march away from the one that marched ahead of it, it was nevertheless during the march a whole day's distance from it, because it had to set off just half a day later. For, as already remarked, the foremost Corps covers the road for a whole day's march in length, therefore the head of the succeeding Corps remains during the march a whole day's distance from the head of the foremost Corps (its rear being another day's march further off,) and it cannot support in full strength on the same day, should danger threaten.

Moveover, on the 10th October Angereau had in fact only reached Gräfenthal, from whence Lannes marched off that same day, and so the former was a whole day's march behind. In view of the absolute obedience which Napoleon demanded and enforced from his subordinates it must have been downright impossible for Angereau to go further forward on this day. The history of the war gives us no reasons for this deviation of Angereau's from the plan of operation. But whoever has seen troops march in a mountainous country, will find it conceivable that Lannes' Corps may during the march over this spur of the Thüringer Wald have grown so long in column, that Angereau could not advance further. An interesting lesson in Strategy—namely, that two Corps marching one behind the other on the same road do not represent a concentrated force for an eventual action, because one cannot support the other with certainty on the same day, especially when the field of battle lies ahead of the foremost Corps. Corps marching on parallel lines support one another more quickly, as I have mentioned before. The circumstance had no disastrous consequence for Lannes, because on the 10th October he did not run against superior forces. Nevertheless it is always interesting and instructive to enquire even into cases in which the result has no drastic lessons to give. Because much occurs in war, which might have been followed by the most disastrous consequences, but passes unnoticed, because these happily did not occur. Here actually the army of the Prince zu Hohenlohe, which on the 8th was at Jena and Roda, might on the 9th have marched to Rudolstadt and on the 10th have prepared for Marshal Lannes the fate of Mortier at Dürrenstein. That it had remained at Jena, Napoleon neither knew nor could have known. Therefore there was full reason for Napoleon's warnings as to prudence.

Further measures for the support of Marshal Lannes from the collateral columns Napoleon did not take on the 10th October. He thought it sufficient to caution him to be prudent, so that he might fall back on Angereau in case he met with forces too strong for him.

On the other hand he did take measures for bringing in case of emergency in the next few days greater forces over to the left column. He drew Ney's Corps which was following Marshal Soult in the right wing column on the 10th October in a forced march of almost 6 miles from Münchberg by Hof to Gefell with its head at Tanna. In this way this Corps was drawn nearer to the middle column, while the rest held on to their original table of operation.

On the extreme right wing Soult arrived at Planen after a march of 4 miles. Consequently behind him there came a gap, because Ney was directed towards the left and Wrede could only get as far as Bayreuth. Bernadotte at the head of the middle column reached the line Auma—Triptis—Neu. Stadt (3 miles,) in front of him Murat's cavalry, behind him Davout, beyond Schleiz. Napoleon himself went to Schleiz, Lannes marched 3 miles to Saalfeld where he dispersed the advanced guard of the enemy, and pushed forward the head of his troops towards Rudolstadt and in pursuit. That behind him Angereau got only as far as Gräfenthal, I have already mentioned.

From the 10th October Napoleon's plan of operation takes a new form. Hitherto it had only consisted of a single advance in mass, which he began from the point of concentration of his army on the nearest roads towards, at one and the same time, Dresden and Berlin. The action of Saalfeld, the retreat of Tanentzien's troops in his front, the fact that the French right column found as good as no enemy before it, showed him the possibility of reaching the enemy's left flank and threatening his retreat on Berlin and Dresden.

A regular plan of operation Napoleon did not issue. What he published later in his bulletins and otherwise about the events, is without historical value, for he understood perfectly how to do violence to truth, as his needs demanded. But in the letters in which he instructed his more distant commanders and gave them general "directives," he published his thoughts without reserve, as they actually lay in his mind. Thus the two letters of the 10th October to Soult are of the greatest historical interest. In these two letters he gives his ideas full and real expression just as they crossed his mind. The disorder in which all that he has to say, is here poured forth, proves that he wrote in hot haste, and leaves one to guess that these letters are amongst those which he is said to have dictated four at a time to his secretaries. But this very confusion and haste lends the letters the stamp of truth.

First it appears that he held it possible that the enemy should advance against him on the offensive. The presence of Prince Louis at Saalfeld and the forward move of the duke of Weimar over the Thüringer Wald upon Schmal Rahlen and Meiningen on the 9th October gave rise in him to these thoughts of an offensive on the part of the enemy's force. In the case of such an offensive he considered his army not yet concentrated enough, and so formed the plan of concentrating it in a defensive position at Schleiz. He was delighted that the enemy should attack him there. It was characteristic of the tenacity with which he clung to a course once taken that he did not allow himself to be at all disturbed by the forward movement of the duke of Weimar, although this manœuvre must have seriously endangered his line of retreat, if it was carried out with any considerable energy. He knew too surely that the enemy must strike at his main forces, if he would obtain any thing decisive. But the more forces the enemy pushed forward southwards, the more forces he detached, the weaker only could he show himself for the decisive battle. And so the thought that the enemy might attack him, "charmed" him. If however the enemy wished to have himself attacked, then he certainly would attack. After the battle he would be in Dresden and Berlin before the enemy. So he writes. You see, he thinks first of the enemy's army which he wants to beat, and only then of geographical points Only in case of the enemy retiring upon Magdeburg does Napoleon speak in this letter of reaching Dresden without a battle. This place had, as I already once, I think, observed to you, such an attraction for him, because he wanted to detach Saxony from the Prussian alliance.

From the letter it further appears that on the 10th October Napoleon conceived the plan of striking the enemy, if he could attack him, in such a way that the battle would be fought with changed front, himself with his back towards the neutral Austrian boundary, his opponent with his line of retreat to Berlin in danger. Since the Prussian army still had a wide-spreading territory right behind it as a base of operation, while Napoleon had nothing but a friendly neutral state, the strategic position in case of an unsuccessful outcome of the battle was for more critical for Napaleon than for his opponents. Strategic operations of such a kind can only be undertaken, when the tactical result is an absolute certainty, and there is no need of drawing the possibility of failure into computation.

Napoleon was fuily aware that in such an operation he might be in a critical position for days, because the advance of the duke Weimar (whose strength was unknown to him) in the direction of Schweinfurt threatened his line of communication and might disturb the regular supply of provisions At all events he recommended Marshal Soult in writing to procure himself bread, with which he was to be provided for several days, if he joined Napoleon. It is also certainly a matter of course that if Napoleon actually carried out the left wheel of his army which he had in mind, provision transports could not easily reach the right wing across the other corps

Whilst Napoleon was writing, he received Soult's report of the evening of the 9th October from Planen, that he had found only about 1,000 men of the enemy in front of him. These had moved upon Gera. In the direction of Dresden there were none of the enemy.

Napoleon now drew his whole army together for mutual action, like a tiger crouching to spring. He believed the Prussians wished to confront him at Gera. But he was doubtful whether they could be concentrated in front of him there. So he desired to quickly crush the enemy's left wing at Gera with superior force and then adopt his change of front. With this aim he concentrated his army towards the middle column and attained thereby the double object of drawing the left column from its threatened position on the further side of the Saale and of uniting the whole army for a blow with full strength. Such was the tenour of his orders for the 11th October which must have been issued in the course of the 10th, for in his second letter to Soult (6 P. M. of the 10th October) Napoleon refers to them.

By these orders he drew the left column from Saalfeld over to Neustadt and to the right bank of the Saale.

Bernadotte with the cavalry of Murat before him was pushed forward as advanced guard of the whole army upon Gera; Davout followed upon Mittel-Pollnitz; Napoleon went with the Guard to Auma, while Ney was brought over to Schleiz and Soult to Langen-Wetzendorf to the middle column.

Consequently the right column now, after it had had a circuitous march through this closing in on the middle column, formed the reserve of the whole army for a battle in the front. Napoleon therefore intended to concentrate the army on a front of only 3 miles, a depth of 6 miles In this way he was better prepared for a general offensive towards the left flank than towards the front. But he certainly thought and rightly, that in the direction of the front at Gera he could not as yet have the whole forces of the enemy to deal with but rather towards the left flank. Yet withal on this day he operated with great caution. For if, as he thought not altogether impossible, the enemy had pressed forwards from Gera in full force, he would have let his advanced guard (Murat and Bernadotte) fall back, and have been able to concentrate his whole army in a single day on the line Triptis—Pöllnitz—Weida.

In the statement that the Emperor drew his army together on the 11th on a front of 3 miles I have taken no notice of the circumstance that in fact Angereau had on the 11th October remained behind at Saalfeld. That he should do this, however, seems not to have been part of Napoleon's plan. For he writes to Soult* "I hope Marshals Lannes and Angereau are at Saalfeld." He had therefore no knowledge that Angereau on the 10th had only reached Gräfenthal and on the 11th could not get further than Saalfeld. He seems to have supposed that Angereau had been able to keep his interval of only half a day's march and must have come to Lannes' help, as soon as the latter had been involved in an action. That is to say, of the action of Saalfeld Napoleon had not yet had any news, when he wrote at 6 P. M. to Soult. He had only heard the cannonade.

Angereau then had not been able to carry out the Emperor's orders and had not come up to what was expected of him.

Napoleon held the principle and has often expressed it, that in order to get possibilities out of troops, impossibilities must be demanded of them. This principle is a very dangerous one for if such orders are given that allowances have to be made, if a command is not fully executed, then it is impossible to know for certain on what one can reckon.

If the strategic dispositions of our highest commanders in the war of 1870-1 are observed and compared with what was actually carried out, it will in no case be found that an army corps was ever unable to perform a march that was demanded of it. Our Generals were therefore well trained and made no wrong calculations. Do not imagine that I take it upon myself to find fault with a military genius like Napoleon. I will only say again, as I have already done before, that our chieifs built upon the study of Napoleon's system and improved on it. Napoleon was to a certain extent the originator of modern Strategy, which culminates in the principle that for the decisive battle one can never be too strong. But as originator, he was not in the position to profit by the study of the past. He had been obliged to build up his strategy himself from his own experience. It was therefore open to improvement.

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* In the letter dated 6 p. m. 10th October.—Tra. slator.

I should like to notice to you another interesting point in these two letters to Soult. Namely, the method of Napoleon's system of command, as it therein appears. He specified how and to what place the corps were to march on the following day. His chief of the staff (Berthier) prepared the orders according to these directions. Along with this definite issue of orders there appear however these private letters as well of the Emperor's to his Marshals, more especially to those who from their distance away and their isolated position might chance to be obliged to act 'independently and at variance with the orders. These letters were consequently general "directives" in which the Marshals were as clearly as possible made acquainted with the general situation and intentions of the Emperor, so that they were in a position to act in unforeseen cases in unison with the whole machine Thus, he gave express permission to act independently and at variance with orders; for example, in the letter of the morning of the 10th he says, "If you find any thing to do against the enemy one march from you, you can do it with confidence."

This very method of command of an army, which ran concurrently with the regular issue of orders we find again in the German system in the war of 1870-1, only improved and more systematically organized. At critical moments there were sent to the Army or Corps commands from the Grand Head Quarters of H. M. the King, officers of the General Staff, who were fully acquainted with the general situation. But not too much time was lost in Correspondence. The letters that they brought were only short ones. The messengers could give oral information upon all points and make the leaders of the armies and corps aware of the intentions of the commander-in-Chief. Thus, staff officers were sent to Speyer to the Crown Prince before the attack on Weissemburg, thus also on the 14th August to the battle of Colombey-Nouilly, and later when MacMahon's march northwards to turn our right flank became known, and again to the battle of Beaumont. I only mention a few cases, which are directly known to me personally.* * *

In later times Napoleon sometimes sent for commanding generals singly and had interviews by the hour with them to acquaint them with his intentions. Marmont in his memoirs complains bitterly of this, because he was thus robbed of the time he wanted for making all the dispositions for his corps, and these complaints confirm my former assertion to you that it is not desirable to call the subordinate generals away out of reach of their commands. Napoleon did not do this systematically nor often. He seems by Marmont's account only to have done so to silence the disquiet of his mind in critical situations sending for one or the other of his oldest confidential friends in order to give vent to his feeling.

He had moreover no such well trained General Staff, as the German army had in 1870. Such a General Staff produces the reliable men that can be sent to the subordinate generals.

The events of the 11th October enlightened Napoleon still further as to the enemy, and on the night of the 10th-11th October he must have received Lannes' report of the action of Saalfeld.

He had ascertained the following; the advanced guard of Prince Louis was shattered at Saalfeld and the fragments of this force as far as the neighbourhood of Rudolstadt had not been absorbed by any fresh troops. The advanced guards of the French main army (Murat and Bernadotte) had reached Gera without resistance. Next, the cavalry had come up with some baggage trains (perhaps those of Tanentzien's corps) which were attempting to escape from Gera by Crossen to Camburg. A number of waggons were taken. Reconnaissances were pushed in the direction of Zeitz, Jena, and Altenburg, and no troops of the enemy were encountered.

The French corps then on the 11th October all reached their ordered destinations, Angereau alone did not get further than to Saalfeld.

Napoleon, misled by the backward movements of the Prussian detachments upon the right bank of the Saale, believed that the enemy's army was on the point of retreating over the Saale and Ilm. He therefore made dispositions for the 12th October with the view of coming up with the enemy but also at the same time threatening his line of retreat upon Berlin. This was to be effected by a left wheel forward on a vast scale of the whole army.

The forward moving pivot of this wheel was to be Angereau, who was to march on the left bank of the Saale from Saalfeld upon Cahla. Lannes had to march by Neustadt and upon Jena. Davout, reinforced by a division of Dragoons, was by a forced march pushed forward up to Naumburg. Soult and Napoleon (the Guard) reached Gera; Ney Mittel-Pöllnitz The Emperor seems to have still thought it not possible that the enemy would wholly denude the environs of Leipzig and Dresden of troops, for he sent Bernadotte and Murat to Zeitz with the order to further reconnoitre towards Leipzig.

After this wheel the army on the evening of the 12th October stood fronting west.

In the first line Angereau at Cahla, Lannes between Neustadt and Jena, Davout at Naumburg. Behind these Ney at Pöllnitz, the Guard and Soult at Gera, Bernadotte and Murat at Zeitz. and so properly speaking the army was divided into two parts of which Davout, Bernadotte and Murat together appear detached to the north, in order to threaten the enemy's flank and rear.

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It will astonish you as much as it does me that Napoleon who on the 10th October was solicitous about Marshal Lannes' march on the left bank of the Saale although he could have fallen back on Angereau, now two days later ordered the latter to advance absolutely isolated still further upon the left bank of the Saale from Saalfeld to Rudolstadt where no support could possibly be guaranteed to him on the 12th October. The success at Saalfeld was not of such consequence that thereby all danger might seem to have been removed. Prince Louis' troops had numbered scarcely 10,000 men. The closer the army approached the enemy, the more pressing must the danger have appeared. It only remains to suppose that Napoleon laboured under the strong conviction of the full retreat of the enemy. That he was mistaken, the facts themselves prove—namely, the Prussian main army had been at Blankenhayn on the night of the 10th-11th and could have marched on the 11th just as well to Rudolstadt as to Weimar without Napoleon's hearing of it. Then it could have crushed Angereau of the 12th October at Rudolstadt and hurled him into the Saale. This is again a proof that the Emperor did not demand of his cavalry strategic information to such an extent as we now do, apparently because he was afraid of the superiority of the Prussians in that arm. Else he would have given Angerean sufficient cavalry and they must, if properly employed, have brought in full information about the enemy.

You must feel surprised too that Napoleon directed Bernadotte, who was marching at the head of the army, to Zeitz and Marshal Davout upon Naumburg over 6 miles distant. Had he on the contrary pushed forward Bernadotte upon Naumburg and Davout upon Zeitz, neither corps would have over-exerted itself, for they would have had a march of only 4½ miles before them.

The more skilfully Napoleon disposed his corps, the more must one wonder at these measures and ask the reasons. He had had a report that in the direction of Zeitz the enemy had not shown himself. Had his cavalry patrols advanced to but so short a distance that their reports could give him no feeling of security? Had they then again not fulfilled their object? Did he on this account apprehend that the corps that should march direct upon Naumburg might be in danger from the side of Zeitz, and therefore send first one corps to the latter place and then let the one following behind go on to Naumburg?

This cannot have been the only reason. Napoleon might perhaps have imagined another force of the enemy to be lying between Zeitz and Leipzig, but he must have understood that the main force of the enemy was not to be expected from that quarter. For the day before the baggage of Tanentzien's corps which fell into the hands of troops marching upon Gera, had been seized in flying retreat upon Jena and Camburg. He must have supposed the main force of the enemy to be to the northwest, as he directed the left wheel of his army in that direction.

It is evident that he must have had another reason for the measure which seems to us so surprising. One might almost suppose that the characters of the Marshals induced him to it. To Marshal Davout he had often entrusted tasks that demanded independent action. If we suppose he had doubts of the capabilities of Bernadotte, that Marshal's conduct on the 14th October and three years later at Wagram only too well confirmed these doubts. What Marmont in his memoirs imparts as to the opinion which Napoleon held of Bernadotte, agrees with this view. Of a certainty strategic measures do at time depend on the characters and capabilities of the subordinate leaders and a prudent chief takes this into calculation.

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Even more than at the marches of Davout's and Bernadotte's corps will you wonder, as I do, at the medley into which Napoleon on the 12th

October shuffled his corps in order to carry out the left wheel of the Grand Army in a single day. You know how much it takes to decide to allot an Army corps new lines of communication and operation, because with this change in the rear of the corps minute arrangements have to be made which are seldom effected without considerable misunderstandings. Still more numerous are the misunderstandings, when one corps exchanges its line of operation with another corps. For then columns necessarily cross one another behind the front. Such crossings of columns are terribly fatiguing for the troops, and at every fresh stoppage at least half of the troops are delayed often a full day's march and more. Often, I might almost say generally, these crossings are attended with a fatal confusion, which finds its most glaring expression in a block of waggons such that at last no one can move backwards or forwards or pass along the road. It is therefore a main rule of the General Staff to avoid crossings if possible.

I once beheld a muddle such as I have described behind the front, and the fearful confusion, the perplexity into which all the waggon and column leaders were thrown, is still so fresh in my memory that I feel even now an absolute horror of it. It was after the battle of Sedan in which our collected army corps had formed a perfect ring round the enemy and were then all massed together on one point. In spite of the most cautious measures taken by our chiefs who on this account ordered the army to radiate outwards to extricate itself before it started on the advance upon Paris, crossings could not be avoided. Our army—the army of the Maas—was even obliged to make marches rearwards and notwithstanding this, when it advanced, it came upon columns of other corps marching across it on the 6th September.*

In 1870 the trains were for the most part organized like military bodies, at least they were under strict military leadership and superintendence. What could it have been like in the case of 1806, when they were glad if they could get the guns drawn by military teams.

Blume gives the marching depth of an army corps inclusive of staffs, trains and columns at roundly 38 Kilometer or 5 German miles (the French corps at that time were sometimes stronger, sometimes weaker than the Prussian are now.) Therefore a corps on its march forms a long thin thread, along which orders and reports find their way from front to rear, from rear to front. In Napoleon's army two or three corps marched on the same road and the thread was 10 to 15 miles long. But since the corps were to support one another mutually towards the front, the train even of the foremost corps will have probably followed behind the hindermost. Thus then the long thread consisted of varied and changing elements. As long as the whole remained on the same road, all went well. But if, as on the 12th October in the French army, the heads of these threads are twisted together, then there must arise a tangle of confusion behind, which is very difficult to unravel * * *

Only the General Commanding himself can lessen the evil by sending back authorities such perhaps as the Quarter Master General, with dictatorial power to restore order. But disorder will not be avoided altogether even then. Delay and confusion always arise.

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* Battle of Sedan fought on September 1st.—Translator.

How complete a change then was it that Napoleon undertook this day with his corps!

Of the troops which had hitherto taken the middle route, the Guard alone still remained in the centre; the rest (Murat's cavalry and the corps of Bernadotte and Davout) formed from this day forth the right wing. The two foremost corps of the right wing (Soult and Ney) were taken into the centre, and Ney who had hitherto been marching behind Soult, now stood on his left; the two corps of the left wing [Lannes and Angereau] likwise now stood beside instead of behind one another.

Moreover the army had its front almost facing west, its rear towards the frontier, not much more than two marches distant—of hostilely neutral Austria. All the supplies had to come from the left wing and seek their destination along the whole length of the army, for the base of operation, the present kingdom of Bavaria, lay now right in prolongation of the front of the army close to its left flank.

It was impossible for the army to persevere long in this position; yet Napoleon seems to have anticipated such a situation as possible, at any rate he had ordered the Marshals to provide themselves with food for several days, that is to say, to render themselves independent of their trains.

With his experience in strategic dispositions he must have been very well aware of this situation, and it is as well not to suppose that he may have created it by a mistake, by an error of judgment. Nor can it have been unknown to him that Prussian Hussars of the Regiment Rudorf had on the 11th entered Schweinfurt, for they had made prisoners there, carried off convoys, and in short broken his line of communication.

Ten years earlier before Mantua he had amazed the world by a bold campaign. He completely gave up his line of communication, sacrificed the siege material, marched through the Alps round the army of relief, attacked it from the rear and hurled it into Mantua, where it finally only increased the numbers of the starving and hastened the capitulation. That time he had acted like Cortez, who burnt his ships behind him. But that time he had found himself in a critical situation and could free himself only by some such desperate act as this; he was too at that time still a young adventurer who had only to make his name. Now he was the mighty Emperor and had no need at all to lead his army into a critical position. Hopfner on this account blames Napoleon's procedure on the 12th October most severely.

To me it seems as though Napoleon so despised the united forces of Prussia and Saxony as to believe failure to be utterly impossible. This is also apparent from the earlier letters and from the expressions already once quoted by me:—"Je ne sais pas ce qu'ils veulent...Je crois qu'ils veulent avoir une lecon...nous ferons une belle campagne" &c. Strategy of course would be an easy matter, if one had received beforehand from fate the assurance of remaining the victor in every fight. But that one can never tell beforehand. Even with the greatest superiority in numbers, in fitness and war-proficiency on the part of the troops, unforeseen circumstances can put the result in question.

We see this in a consideration of the events of the 13th October. Seldom probably has an army had a greater superiority over its opponent than the French had then. And yet it was only through peculiarly lucky circumstances that it escaped on the 13th October very heavy blows which would have brought it instantly to a standstill in this critical strategical position. This confirms what I wrote you in the first letter that war is always a hazard and that therefore in war we must *dare*, if one aim at success, when we have calculated whether the chances of success, are on our side. Napoleon here dared for the sake of the greater result, after he had calculated that the superiority of his united masses gave him the probability of victory. We too fought at St. Privat and Gravelotte with a changed front without being quite certain beforehand of success.

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On the morning of the 13th Napoleon at first seems to have been much in doubt as to what to do. He appears to have received reports from all the Marshals except Lannes. The only direction he gave was that Ney should march upon Roda, while Lannes was to resume his movement upon Jena; the Bavarians [under Wrede,] the tail of the right wing column, who now also came up, were directed to Schleiz, that is, drawn over to the centre, and Bernadotte marched to Davout to Noumburg; the rest of the army was to have a day's halt.

Forced marches like these with the whole army are not made for the sake of a day's halt. Either—the corps had pressing need of this rest which would teach us the lesson that it is most hazardous to exhaust troops with forced marches, for they usually lead up to the *dénoûement*, or else would not be undertaken; while if troops have urgent need of rest, they cannot co-operate with energy for the *dénoûement*. Or else,—Napoleon was still in ignorance of the whereabouts of the enemy's army and knew not whither he ought to direct his corps. It is extraordinary to me that Angereau was not taken from his halt and directed on Jena.

In the course of the morning Lannes' report seems to have come in, that he had come into collision with the enemy at Lobeda, Bergan and Winzerle. Napoleon now directed Soult's corps on Roda and Köstritz and betook himself to Jena.

In the meantime Lannes had occupied the Landgrafenberg at Jena with his advanced guard and seen the whole army of the Prince Zu Hohenlohe before him. The news of this Napoleon received an hour from Jena. He now gave the order that the Guard and Soult were to follow upon Jena. But this support would have come too late, for he could easily have become an eyewitness of the annihilation of Marshal Lannes, when he arrived on the Landgrafenberg at 4 o'clock in the afternoon.

Permit me to point out to you in anticipation that before this the Prince zu Hohenlohe set his army into motion to throw the weak forces of Lannes into the Saale. His army was just moving joyfully to the attack, when straightway came Massenback from Weimar from the King and brought the fatal order based entirely on a misunderstanding, not at any price to make an attack on that day. At the same time the start of the Prussian main army was by an unlucky chance so delayed that on the evening of the 13th the pass of Kösen was not occupied. Suppose these two mistakes had not occurred, then on the 13th Lannes would have been destroyed and the pass of Kösen would have been held by Prussian troops, and perhaps the advanced guard of Davout would have suffered a check there.

On the 14th October, however, according to this Angereau would have found himself in a highly dangerous position ; the other corps of the French army would have been obliged to halt at Jena, Dornburg, Comburg and Naumburg at the impassible defiles of the Saale. The French army would have fallen into the same position behind the Saale for some days, as three years later behind the Danube after the battle of Aspern, only with this difference that it would have been in still worse plight as to its base and rear communications, for Napoleon had for the moment completely abandoned his line of retreat. Prussian Cavalry indeed had advanced into Schweinfurt.

Höpfner says that had the Prussian army been properly commanded, such an unfavourable result not only could but must have been the outcome of the enemy's combinations, and then the judgment of contemporaries would have condemned Napoleon just as severely as they now extol the wisdom of his calculations. He adds :—" If Napoleon knew the condition of the supreme command, the despondency &c., of the Prussian army, so that be believed it possible to venture anything, he was undoubtedly justified."

I have already signified to you that Napoleon was probably aware of a considerable superiority and could venture much, and that I cannot on this account join in so severe a condemnation of his measures, as Höpfner expresses, who declares he can only wonder at Napoleon's luck.

But if one considers that those two happy chances were necessary to bring about so favourable a result for Napoleon, one recognizes that to a favourable result in war even with great superiority of strength and of strategic foresight there pertains yet another element, which is called by most men luck, by the more discriminating the higher Hand which directs the destinies of men.

Napoleon believed in this higher hand, his star as he called it :— " La balle qui me tuera, n'est pas encore fondue," he said at Jena.* * * * Hence this confidence, which is the first condition for daring, if the chances have been weighed beforehand.

* * * * * *

The events of the 13th October lead to yet another reflection :

Napoleon had started on his march in close concentration and yet had fallen into such a position that if the idea of Hohenlohe on the 13th had been carried out and the march of the main army not been delayed by an accident, the operation in view would have miscarried. Of that very army marching as it was in concentration, parts could on the 13th October have been beaten isolated at Jena and Kösen.

What lesson do we gather from this !

The best strategic leadership can be baffled, if incorrect information or none at all is had of the enemy's movements. It is quite impossible to march for long so concentrated as to be in a position at the first tactical contact with the enemy to act conjointly with the whole force. Hence it is necessary to calculate the correct moment at which to concentrate. "March disunited, fight united" is the great art of Strategy, as our first strategist says. For this it is requisite that calculation be based on the clearest possible knowledge of the enemy with which the reconnoitring cavalry must supply the strategist.

October 14th.—When Napoleon a short distance from Jena received the report from Lannes, that he would probably be attacked that day, he issued the orders to concentrate the army at Jena. These orders were complete by the time he had had a sight of the enemy from the Landgrafenberg. In compliance with these the army on the night of the 13th 14th stood as follows :—

Lannes in front of the Landgrafenberg ; the Guard upon it ; Angereau above Jena on the Galgenberg ; Ney at Roda, advanced guard towards Jena ; Soult in a night march upon Jena, which his leading troops had already reached. Murat's cavalry which was summoned back from the detached army on the right. [Bernadotte and Davout,] between Camburg and Dornburg on the right bank. At Naumburg Bernadotte had joined Davout. There was therefore nothing left of the intended day's halt on the 13th. Davout's corps alone had not moved.

In his dispositions for the battle Napoleon united Angereau, Lannes the Guard, Ney, Soult and Murat against the enemy's front at Jena. Marshals Davout and Bernadotte were to march upon Apolda by Naumburg, Kösen and Camburg respectively, in order to attack the enemy in flank and rear.

It is again evident that Napoleon let himself be strategically very badly served by his cavalry. For since he could suppose the enemy to lie in a north-westerly direction, strong cavalry ought to have been pushed forward thither and have covered the left flank of the army on the 12th October in its march northwards. He still supposed the forces of the enemy that were visible to him to be the whole united army. As a matter of fact he had only the smaller portion, the army of the Prince zu Hohenlohe, opposite him. Against this smaller portion therefore were the dispositions of his whole army directed. The larger portion was quite left out of calculation and surprised him by its existence.

That Napoleon with threefold superiority of numbers shattered the army of the Prince zu Hohenlohe and finally dissolved it with his numerous cavalry on the open plateau of Weimar is not to be wondered at.

Davout on his side with his corps of 30,000 men collided, as he defiled through the pass of Kösen, with the enemy's main army, which was rather more than doubly superior to him in numbers. Davout's clever conduct of the fight, the activity of his troops, and the superiority of skirmishing tactics over line tactics had this effect that Davout not merely asserted himself but gained a mile of ground forward.

The Prussian main army was not, properly speaking, beaten at Auerstadt. Their attacks had merely been repulsed and then the order to retreat had been given without the very considerable reserves having been employed. Davout's troops moreover had suffered frightfully and had reached the limit of their fighting power (loss 270 officers and 7,000 men, that is, a quarter of their strength.) The failure of Auerstadt amounted to a defeat for the Prussian army only during the days following through the despondency of the troops, the pursuit and the destruction of the other army.

Most inexplicable is Bernadotte's behaviour on the 14th October. He was directed by Napoleon upon Apolda through Camburg in order to co-operate there with Davout (who was to press forward by Kösen and Eckardsberga) against the left flank and rear of the foe. At Camburg he received at 9 o'clock the report of the presence of considerable masses of Prussian troops at Sulza on the further side of the Ilm, and this was the grounds on which he went by way of Dornburg. This logic is hard to comprehend; for the spectacle of masses of Prussian troops at Sulza told him that Napoleon's supposition was incorrect, according to which the right wing of the Prussians was to be found at Apolda. The order to co-operate with Davout ought at the sight of Prussian troops at Sulza have confirmed Bernadotte in the original intention of choosing the passage of the Saale at Camburg and then he must have attacked the troops at Sulza. If we think that Bernadotte who at 9 o'clock was at Camburg, would at 11 o'clock have appeared at Sulza in rear of the Prussian main army, whilst it was most hotly engaged against Davout, we cannot avoid feeling convinced that then the main army too would on the 14th October at Auerstadt have been dissolved.

I find it difficult to guess the course of reasoning that Bernadotte followed. What prompted him to this strange proceeding was not an adherence to the wording of the Emperor's order, for he allowed himself the liberty of choosing according to circumstances a crossing point over the Saale other than that which Napoleon had prescribed for him. He was therefore fully aware that a detached commander and above all the general commanding an army corps must constantly enter into the ideas only of his chief and may often be so placed that taking the sense of the ideas made known to him he was to act contrary to the letter of orders received, and has therefore to obey with understanding, to bring initiative into obedience. So that it almost seems as if Bernadotte was one of those strategists who preferred to gain by manœuvring what demanded an engagement and who liked to avoid fighting.

* * * * *

Before I turn to the strategic dispositions of the Prussian army as far as they went until the collision of the 14th October, I must bring to your notice the marching performances of the French corps.

After the two days' rest which Napoleon in anticipation of their pending exertions vouchsafed the army, the corps made the following marches:—

Soult on the 8th October 3 miles, the 9th October 3 miles (Hof,) the 10th October 4 miles (Planen,) the 11th October (Langen Wetzendorf) 3 miles, the 12th (Gera) 4 miles, the 13th October the corps was ordered to rest, but had on the night of the 13th—14th to march to Jena, 5—6 miles. That is to say, after the corps had accomplished 17 miles in 5 days, it ought to have halted a day. The necessity for hurrying to the battle compelled a forced march in lieu of a day's halt.

Ney marched on the 8th 3 miles, the 9th 3 miles (Münchberg,) the 10th nearly 6 miles (Gefeil-Tanna,) the 11th 2 miles, the 12th (Mittel Pöllnitz) 3 miles, had also therefore marched 17 in 5 days, when on the 13th he was ordered to halt for half a day (he had only as far as Roda to go, 1½ miles,) and half a day's halt is admittedly as good as none at all.

Bernadotte marched on the 8th 3 miles, on the 9th 4 miles (Ottersdorf near Schleiz,) on the 10th 3 miles (Auma-Triptis,) the 11th (Gera) 4 miles, the 12th (upon Zeitz) 3 miles and the 13th (Naumburg) 3 miles, 20 miles in 6 days.

Davout and the Guard marching behind Bernadotte made up to the 11th inclusive the same stages, then however Davout had on the 12th to do 6 miles to Naumburg and had therefore marched 20 miles in 5 days. But in spite of the crisis of the 13th no further march was demanded of him on that day; he was allowed to halt.

The guard had up to the 12th marched as far as Gera 17 miles in 5 days, was ordered to rest on the 13th, but then on account of the critical position of Marshal Lannes had to march from midday till night on to the Landgrafenberg (6 miles.) This makes 23 miles in 6 days.

Lannes on the 8th October marched 3 miles, the 9th (Gräfenthal) 4 miles, the 10th as far as Saalfeld 3 miles, where he further fought an engagement, the 11th to Neustadt 4 miles, the 12 towards Jena 3 miles—total 17 miles march and an engagement in 5 days. On the 13th the presence of considerably superior numbers of the enemy prevented him from marching further than up to the Landgrafenberg. Angereau accomplished somewhat fewer miles in the same time.

Most of the corps in the 5 days of marching did 17 miles. After this performance their experienced leader ordered a day's halt, but he did not hesitate to renounce even this rest day, as soon as the opportunity presented itself for a decisive blow, and demanded instead of the halt still greater exertions than hitherto, and after that again a battle. Some corps had even to make night marches and then take part in a pitched battle.

If we proceed to compare these performances with those of the German army of 1870, I should like to quote the marches only of our guard corps, because then I can speak as an eye-witness. The corps halted a day on the 9th August, then marched 3, 1, 4, 2, 3½, 2, 2½, 5 and on the morning of the battle of St. Privat 3 miles, after which from midday it took a prominent part in the battle,—total 26 miles and a pitched battle in 9 days. This marching performance falls somewhat short of that of Napoleon's corps in 1806, which accomplished more than 3 miles a day. The guard corps (in 1870) left behind only 500 footsore men to garrison Dienlonard. How many men the French corps (1806) left lying by the way on the marches in question, cannot now be determined. It is possible and even probable that the French corps had more experience and practice in marching, for they had been for years on the move under conditions of war. The Prussians in 1870 came from the garrisons of a time of peace, were to the extent of half augmentation men, who had to wear new boots and had had long railway journeys from the rear, which cause the feet to swell. Do not be surprised that I speak of boots in writing on Strategy. The boot is an essential element in the marching of infantry and plays a leading part in Strategy.

After the rest day of the 22nd August the guard corps marched 3½ miles on the 23rd, then 2½, 4, 4, 3, 2, 2, 3, 4 miles and by dawn of the 1st September 3 miles in order to have a decisive share in the great battle of Sedan. This amounts to 35 miles and a pitched battle in 10 days. The loss however through the exertions of these marches amounted to over 5,000 to 6,000 men. As I have said, statements are wanting as to how great losses the French corps suffered through their forced marches in 1806. But it must be acknowledged that they must have been in very good marching trim, if after such efforts they were still able to win a great victory.

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I cannot forbear, observing that, as is generally reckoned a battalion can march 3 miles a day, but after three days must have a halt on the fourth day, if it is not to be overexerted. If you consider now that often 1 or 2 miles extra fall to individual battalions, when the whole corps moves 3 miles, then you will admit that the 6 days' march of the French corps to the battle of Jena, the 9 days' march of the Prussian guard corps to the battle of St. Privat and the 10 days' march of the same corps to the battle of Sedan are prodigious performances, such as probably cannot easily be surpassed. You must not forget that in concentrations of such great masses of troops as are necessary for big battles, the food supplies can never be as regularly delivered as in the case of single battalions or in peace, and that irregular nourishment weakens the bodily powers.

If you further take into reckoning the excitement and exertions called forth by a great battle, you will then have an idea what a relaxation of mind and body takes place as soon as the battle is over. Hence it is easy to explain why so often after a battle enough advantage has not been taken of the success by an energetic pursuit. For there is needed a gigantic strength of will on the part of the General, so that he may still demand of his troops, tired to death as they may be after a battle won, the hardships of unremitting pursuit, and there is needed an almost superhuman devotion on the part of the troops, so that they may fully act up to this demand instead of giving themselves up to that rest which we may suppose them to have fully deserved,

It is on the other hand evident what immense results an energetic pursuit must have, because with the defeated troops fatigue is doubled and trebled by despondency. That the Prussian Army at Auerstadt and, where it was only repulsed and had not as yet suffered defeat, was completely and finally destroyed by the pursuit is historical proof of this fact.

No one can measure the state of exhaustion of the troops after a battle, who was not himself present at that battle, and therefore the historical student must be in possession of all the conditions, before he can criticize the behaviour immediately after the battle or deduce lessons therefrom for the future. And so we do not care to go into the strategic proceedings following the battles of the 14th October, 1806.

STUART'S RAID.

A NARRATIVE OF GENERAL J. E. B. STUART'S RECONNAISANCE ROUND GENERAL G. B. MCCLELLAN'S ARMY, IN FRONT OF RICHMOND, ON THE 13TH, 14TH AND 15TH JUNE 1862.*

BY

SUB-CONDUCTOR J. J. KÖNIGS, B. U. L.,

Librarian, Intelligence Branch, Qr. Mr. General's Dept. in India.

After the battle of Fair Oaks or Seven Pines (31st May 1862) there was a pause in active operations in front of Richmond (Virginia), partly owing to the exhaustion consequent upon that event, and partly to the weather, which for the next two weeks was unfavorable to such a degree as to render any advance almost impossible.

General G. B. McClellan's left and main bodies, on their approach to the confederate capital (Richmond) had been forced to encamp in the mist of the Chickahominy swamps, where the Federal soldiers, exposed to the malarious poison of that fatal region, and exhausted by incessant labor on the intrenchments, sickened and died by thousands.

General McClellan's right in order to secure the communications with his base of operations on the Pamunky River, became inordinately lengthened.†

It had been ascertained that the long and attenuated line of General McClellan's army was for six or eight miles a mere shroud of cavalry pickets, thus rendered liable to be penetrated at any point.

The enterprising Confederates were quick in discovering this weakness of their opponents and in availing themselves of the advantage it offered. Their first move was a daring reconnaissance by a large force of cavalry under General Stuart, which succeeded in penetrating the extreme right of General McClellan's line, gaining its rear on the Pamunky, and retiring across the Chickahominy in safety to Richmond. By this brilliant reconnaissance the Confederates took over a hundred prisoners, destroyed much valuable Federal property, captured a large quantity of stores, and obtained, what was destined to prove a still more serious loss to the Federal cause, an accurate knowledge of the fatal weakness in the disposition of General McClellan's army.

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* The following are the principal books and pamphlets which have been consulted :—

The Peninsula. McClellan's Campaign of 1862, by A S. Webb.
History of Cavalry, by Colonel Denison.
The War with the South, by R Tomes.
Richmond Enquirer, dated 16th June 1862.
Stuart's Cavalry, by J. S. Mosby.
Schlachten-Atlas, des neuzehnten Jahrhunderts.
Der Halbinsel Feldzug. April bis August 1862.
Beiträge zur Charakterschilderung des Reiter-Generals
J. E. B. Stuart, by J. Scheibert. Major.

† It was partly the object of General McClellan, in thus lengthening his line to facilitate a junction with General McDowell, but this was prevented by the order of the Government withdrawing the latter from the Rappahannock to cover Washington.

General Robert Lee's instructions to General Stuart, directing, or rather authorizing, the reconnaissance are dated 11th June 1862.

With about 1200 cavalry and two pieces of artillery,* General Stuart left Richmond on the morning of 12th June, moving in a northerly direction towards Charlottenville turnpike to create the impression that he was going to reinforce General (T. J. Stonewall) Jackson. (News had just come of Jackson's victories over Generals Fremont and Shields, battles of "Cross Keys" and "Port Republic.") The force had gone some distance without molestation, when the advance guard overtook some 8 or 10 adventurous negroes journeying rapidly towards the Union lines. These runaways were secured and sent to the rear, and, as night was drawing near, pickets and videttes were posted, and the column bivouacked for the night near Ashland, it being considered imprudent to advance farther.

Early the next morning signal rockets were fired, and answered by the confederate troops at the lines far to the rear, and as soon as day broke the cavalry column proceeded on its march. General Stuart sent an officer in advance with a few men towards Hanover Court House. There had been many surmises as to the destination of this expedition, and now it was seen that a raid on General McClellan's lines was the object in view.

When the advance party got within a few hundred yards of the village, a squadron of Federal cavalry was discovered. The Federals were wont to proceed thither daily for forage, as a captured picket informed the men, but on this occasion had orders to proceed as far as possible towards Richmond. The officer in charge of Stuart's advance party, sent a man back to inform the General of it, so that he might send a regiment round to cut off their retreat. General Stuart ordered the 1st Virginia Cavalry under Colonel Lee to go; but the Federals, suspecting that there was a stronger force than they could see, withdrew too soon to be caught.

The column then pushed rapidly towards the camp of the Federal cavalry at Old Church. At that place Captain Royall was stationed with two squadrons of the 5th United States Regular Cavalry. There was a running fight of several miles with the pickets. From persons captured in and about the camp it was ascertained that several regiments were waiting for the advance of Stuart's column up the road, and as their pickets were stronger and more numerous than usual, it was deemed advisable to halt. The second squadron of the 9th Virginia Cavalry were dismounted and thrown to the front (on the skirts of a wood to the right and left of the road) to act as skirmishers and defend the artillery, which was moved up and placed in a position commanding a bridge in the hollow—the Federal and the Confederate forces being screened from view by rising ground at either end of the road—the Confederate force being farther from the front than the Federal. Appearing in considerable force, the Federals advanced in admirable order, but suddenly facing to the right about, were quickly retreating, when the dismounted men poured a galling fire into them, emptying many saddles, and causing much confusion. Finally Stuart's force met Captain Royall's, who came out with his whole command to reinforce the out-post. General Stuart had no suspicion of the number he was attacking, and as soon as he came in sight, he ordered the 3rd squadron of the 9th Virginia Cavalry, composed of the Essex Light Dragoons, (Captain Latane,) and Mercer's Country Cavalry, (Lieutenant Walker,) under command of Captain Latane to charge the advancing force. Putting spurs to their steeds they dashed gallantly along the road, Captain Latane fifteen paces in front, and the charging squadrons dashed in full shock together.

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* This force consisted of portions of the 1st (Colonel Fitz Hugh Lee) 4th (Lieut. Gardiner, Commanding,) and 9th (Colonel F. H. Fitz Hugh Lee,) Virginia Cavalry a part of the Jeff Davis Legion, with whom were the Boykin Rangers, and a section of Stuart's Horse Artillery, (one twelve pounder howitzer and a six pounder English rifle piece.

The front of either column were unhorsed, and the fight became instantly hot and bloody. Captain Royall was wounded and his force routed; on the Confederate side Captain Latane was killed. Stuart's command could not stay to give the latter even a hasty burial, this was left for female hands to do (The scene has been preserved on canvas by a Virginian artist.) As Captain Royall's command had been scattered, Stuart's force soon had possession of his camp, and were feasting on the good things they found in it. Nearly everybody forgot—many never knew—the danger Stuart's force were in. A mile or so on his left was an impassable river—(Pamunky)—not more than 6 miles to his right were McClellan's Head-quarters, with General Fitz John Porter's Corps and the reserve division of cavalry camped. Here was the turning point of the expedition. There was a short conference between General Stuart and the Lees, who were the colonels of the two Virginian cavalry regiments.

General Stuart was for pushing on to the York River Railway, which was still 9 miles off. Colonel F. H. Fitz-Hugh Lee of the 9th Virginia Cavalry (son of General R E. Lee) was in favor of it, but Colonel Fitz-Hugh Lee of the 1st Virginia Cavalry, was opposed. General Stuart had no idea of turning back, and determined to go on and strike McClellan in his rear. In the conception and execution of this bold enterprise General Stuart showed great genius and an intrepid spirit.

General Stuart's column pushed on, sending one officer (Lieut Mosby) with two men who were familiar with the country in advance towards Tunstall's Station. The officer in charge of the advance party was on a slow horse, and he had not gone very far before General Stuart sent one of his staff to tell him to go faster and increase the distance between the main column and the advance party. It was important that General Stuart's force should reach the railway before dark or reinforcements could be sent there.

General Stuart's biographer, without intention, has made a statement which, if true, would rob him of all the glory of the enterprise.

He says that after reaching Old Church, Stuart kept on because it was safer than to go back by the route he had come. The road to Hanover Court House was open; and it would not have been possible for the Federals to have closed it against Stuart's force for several hours. The fight with Captain Royall was near his camp, and did not last five minutes: it took only a few minutes to destroy it. If Stuart had intended to return by Hanover, he would have left pickets behind him to keep the road open. But Stuart did nothing of the kind The route of the two squadrons of cavalry was in itself an insignificant result as compared with the magnitude of the preparation. At this point he had simply broken through McClellan's picket line, but had not gained his rear. The fight and capture of Royall's camp at Old Church occurred about 2 P. M on 13th June. The nearest camps were three or four miles off. Major Williams, 6th United States Cavalry, reports that he came on the ground with 380 sabres of the 6th United States Cavalry at 3-30 P. M., about one hour after the rear of Stuart's cavalry had passed on towards Tunstall's Station. This one hour would of itself have been amply sufficient to allow Stuart's troops to return unmolested before the arrival of that force. The 5th United States Cavalry came on the ground about 5 P. M; and General P. St. G Cooke, United States Army, commanding the cavalry reserve, with the rest of his cavalry division, Colonel E. T. H. Warren's brigade of infantry, and a battery of artillery, reached there after dark. It is very difficult, therefore, to see what there was to prevent Stuart from returning if he had so desired. In all, there were two brigades of cavalry, one of infantry, and a battery of artillery (6 ten-pounders, Parrott guns) sent in pursuit of him.

General G. F. Emory, U. S. Army, commander of the 1st brigade of General Cooke's cavalry reserve, who led the advance, says that he followed on General Stuart's track, and reached Tunstall's Station at 2 A. M. where he found General T. W. Reynolds, who had come up with a brigade of infantry belonging to General McCall's Division of the 1st Army Corps (General McDowell), consisting of 1st Pennsylvania Reserve Regiment, 2nd Penn. Res. Regiment, 5th Penn. Res. Regiment, and 8th Penn. Res. Regiment on the railway about 12 o'clock. General Reynold's says that Stuart's rear guard had left there about two hours before he arrived. At Tunstall's station, General Emory says he lost Stuart's trail, and set every squadron he had hunting for it, and did not succeed in finding it until 8 o'clock the next morning. As General Stuart had left Tunstall's Station on the plain country road on which he had been marching all day, and on which General Emory had followed him, it seems strange that 1200 cavalry, with two pieces of artillery, should have left no track behind them. Colonel Warren says that "*the moon was shining brightly, making any movement of the Federals, or the Confederates, as easy as in day light.*"

General Cooke, with the rest of the cavalry, infantry, and artillery, arrived about 9 A. M. the next morning. General Emory then moved forward in pursuit with infantry, cavalry, and artillery. Colonel Warren says:—"*It was impossible for the infantry to overtake General Stuart, and as the cavalry did not move without the infantry, it was impossible* *for them to overtake him.*" And General Fitz John Porter regrets—"*That when General Cooke did pursue he should have tied his legs with the infantry command.*"

But then it can hardly be said that General Stuart was retreating. As there were six cavalry regiments—including all the Regulars (viz:—1st. 2nd, 5th, 6th U. S. Cavalry Regiments,[*] and 6th and 8th Pennsylvania Cavalry Regiments) on his track, with a battery of artillery, it is hard to see the use they had for infantry, except as a brake to keep them from going too fast. The pursuit was from beginning to end a comedy of errors. The infantry could not have expected to overtake Stuart, whereas, if he had attempted to return by the same route he came, then they might have intercepted him by remaining where they were.

General Stuart was reduced to the alternative of returning home by the road along the Pamunky river, or the one up James river. If he took the latter, then a slight extension of McClellan's left flank would have barred his advance. It could hardly have been imagined that Stuart was going down to capture Fort Monroe, or that his cavalry could cross the York and James rivers without pontoons. Only the cavalry of McClellan's right was in the pursuit. He had a strong force on his left to block the Confederate advance, and they had 24 hours' notice of Stuart's coming.

Now to return to the narrative of Stuart's march. As the officer (Lieutenant Mosby) was jogging along with his two men, a mile or two ahead of the column, he came upon a well-filled sutler's wagon at a cross-road, of which he took possession by right of discovery. At the same time, about a mile off to his left, he could see the masts of several vessels riding at anchor in the river. This officer sent one of the men back to tell General Stuart to hurry up. The sutler was too rich a prize to abandon, so the officer left the other man in charge of him and his wagon and hurried on. Just as he turned a bend of the road, he came plump upon another sutler, and a cavalry vidette with him. They surrendered at once. Tunstall's Station was now in full view, half a mile off. Lieut. Mosby was alone. Just then a bugle sounded. He saw about a squadron of cavalry[†] drawn up in line, near the railway, He knew that the head of Stuart's column must be close by, and his horse was too tired to run, so he just drew his sabre and waved it in the air. The squadron of the 11th Pennsylvania Regiment knew from this that support was near him. In a few seconds Stuart's advance guard under Lieutenant Robinson appeared in sight, and the squadron in front vanished from view. Lieutenant Robinson captured the railway station without firing a shot. General Stuart soon rode up. Just then a train came in sight, and as the force had no implements with which to pull up a rail, a number of logs were put on the track, When the engine driver got near the station he saw that he was in a hornet's nest, and with a full head of steam dashed on under a heavy fire, knocked the logs off the track, and carried the news to the White House below. General Ingalls, who was in command of White House station, says that he had received a telegram from McClellan's Headquarters, telling him of the attack on Captain Royall's camp and warning him of danger. As soon as the telegraph line was broken, which was about sunset on the 13th June, it was warning to McClellan that Stuart's force was in his rear and on his line of communications.

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[*] There were only 6 regiments of Regular Cavalry in the Union Army.

[†] 11th Pennsylvania Cavalry.

There was now but one route by which Stuart's force could return, and that was up James River. Yet McClellan made no signs of a movement to prevent it, and the only evidence forthcoming that McClellan knew of Stuart's presence, is a telegram to Mr. Edwin Stanton, Secretary of War (Federal) (the next day)—dated 11 A. M., 14th June, saying that a body of cavalry had passed around his right, and that he had sent cavalry in pursuit.

Before reaching Tunstall's Station Stuart sent a squadron to burn the transports in the river and a wagon train that was loading from them. The small guard fled at the approach of his cavalry, while the schooners and wagons disappeared in smoke. As some evidence of the consternation produced by this sudden irruption, may be mentioned the fact that, after his force left Old Church, a sergeant with 25 men of the 5th U. S. Cavalry followed on under a flag of truce and surrendered to his rear guard. They supposed they were cut off and surrounded. The Jeff Davis Legion was the rear guard, and these were the only Federals they saw.

The despatch to Mr. Stanton, Secretary of War of the Union, shows the bewildered state of McClellan's mind. At the time he was writing it, Stuart's force was lying on the banks of the Chickahominy, building a bridge to cross-over. To have caught Stuart's force, it was not necessary to pursue at all; all that McClellan had to do was to spread his wings.

Stuart's force halted at Tunstall's Station long enough for the column to close up. His march was slow, the artillery horses had broken down, and he was encumbered with a large number of prisoners on foot, and of course he could march no faster than they did. After dark the column moved down through New Kent towards the Chickahominy. On the road were large encampments of army wagons. Many a sutler was ruined that night; with sad hearts they fell into line with the prisoners, and saw their wagons, with their contents, vanish in flames. The Count de Paris, who was on McClellan's staff, thus describes Stuart's march; "But night had come, and the fires kindled by his hand flashing above the forest were so manysignals which drew the Federals on his track." Now, the Count de Paris evidently means that the glowing sky ought to have been a guide to the Federal generals. As a fact, the only pursuers Stuart's column saw were those who came after to surrender under a flag of truce. General Stuart halted three hours at Baltimore Store, only five miles from Tunstall's Station. At 12 o'clock he started again for a ford of the Chickahominy river, which was 8 miles distant, and reached it about day-light.

That summer night was a carnival of fun which Stuart's column can never forget. Nobody thought of danger or of sleep, when champagne bottles were bursting, and Rhine wine was flowing in copious streams. All had perfect confidence in their leader. During all this time General Emory, U. S A. was a few miles off, at Tunstall's Station, hunting for the Confederate tracks in the sand with a lighted candle !!

Stuart had expected to ford the Chickahominy river; but when his column got there, it was found over-flowing from the recent rains, and impassable. Up to this point his progress had been an easy one; but now, to get over the river was most difficult. He was fortunate in having two guides, by the names of Christian and Frayser, who lived in the neighbourhood, and knew all the roads and fords on the river. Christian knew of a bridge, or rather, where a bridge had been, about a mile below the ford, and the column was immediately headed for it. But it had been destroyed, and nothing was left but some of the piles standing in the water. The general was again fortunate in having two men, Burke and Hogan, who knew something about bridge-building, Near by were the remains of an old warehouse, out of which they built a bridge. It was marvellous with what rapidity the structure grew; in a few hours it was finished.

During the time that Stuart's column lay on the banks of the river waiting for the bridge, no enemy appeared in sight. That was a mystery nobody could understand.

There was some apprehension that McClellan was allowing Stuart to cross over in order to entrap him in the forks of the Chickahominy. When, at last, about 2 o'clock, the cavalry, artillery, prisoners, and captured horses and mules were all over, and fire had been set to the bridge, some of Rush's Lancers* came on a hill and took a farewell look at Stuart's force. They came, and saw, and went away, taking as their only trophy a drunken Dutchman who had been left on the road. General Emory received news of the crossing eight miles off at Baltimore Store.

Stuart's escape over the river was immediately reported to him. In this official report, he says that Stuart's column left faster than it came. There is nothing to show that there was any particular haste in the march, in fact, it seems to have been conducted very leisurely. About 1 P M., on the 13th Stuart's force captured Captain Royall's camp at Old Church; at sunset it reached Tunstall's Station, 9 miles distant, and at day-light on the 14th got to a point on the Chickahominy river 12 miles away, where the force stayed until noon. So if Stuart's column had been pursued at the rate of a mile an hour, he would have been overtaken.

But the danger was not over when the force had crossed the Chickahominy. They were still 35 miles from Richmond and in the rear of McClellan's army, which was 5 or 6 miles above. It was necessary to pass through swamps where the horses sunk to their saddle girths, and when the column emerged from these, it had to go for 20 miles on a road in full view of the Federal gunboats on one side of the column in the James river, and McClellan's army within a few miles on the other. Nothing would have been easier than for the latter to have thrown a division of infantry as well as cavalry across Stuart's path. He apprehending such a movement on McClellan's left, had sent a messenger early in the morning to General Lee requesting him to make a diversion in his favor. But Stuart's force was out of danger before he (Lee) had time to do it. After getting through the swamp they halted in Charles City for several hours to give rest to the men and horses. Stuart then turned over the command to Colonel Fitz Hugh Lee, as the men were then in comparative safety, and with two men rode on to General Lee's Headquarters, which he reached about day-break the next morning. During the night march nothing particular transpired, except occasionally a negro would dart across the road, going into the Union lines. Early in the morning, just as the column got in sight of Richmond, it met Stuart returning to the command.

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* The only Lancer Regiment in both armies.

Although he had been in the saddle two days and nights without sleep, he was as gay as a lark and showed no signs of weariness. He had a right to be proud; for he had performed a feat that to this day has no parallel in the the annals of war.

This expedition, in which Stuart had ridden around McClellan in a circle of a radius of 10 miles, created almost as much astonishment in Richmond and even in Europe as if he had dropped from the clouds, and made him the hero of the army. It had an electric effect on the *morale* of the Confederate troops and excited their enthusiasm to a high pitch.

This raid is unique, and distinguished from all others on either side during the war, on account of the narrow limits in which the cavalry were compelled to operate. From the time when Stuart broke through McClellan's line on his right, until he had passed around him on his left, Stuart was enclosed by three unfordable rivers, over one of which he had to build a bridge to cross. During the whole operations, the cavalry never drew a sabre except at the first picket post they encountered. But it was something more than a mere raid on McClellan's communications; it was in fact, a reconnaissance in force to ascertain the exact location of the different corps of his army, and the prelude to the great fight* that began ten days afterwards, in which Jackson's flank was covered by Stuart's cavalry.

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* Seven days' battle.

TACTICAL RIFLE MEETINGS AND SECTION COMMAND.

BY BRIGADIER-GENERAL H. BENGOUGH, C. B.

Commanding, Nagpore District.

A few notes on two subjects which may I hope attract consideration and discussion by the readers of our Indian Military Journal.—They are,

1st.—The introduction of rifle practice and of rifle meetings, not at targets on measured ranges at known distances, but on unknown ground, at principally moving objects, as much as possible under service conditions, and combining tactical knowledge with skill in shooting. I propose to call them "Tactical and Field Rifle Meetings."

2nd.—To discuss the best method of carrying out thoroughly the system of "*Section Command*" throughout a regiment, in quarters, in training and in war.

I feel sure that both these points will recommend themselves to the thoughtful consideration of all officers who feel that the elaborate organization of an army, and the, at present, somewhat complicated education of a soldier, has but one ultimate aim, *viz.*, that of enabling him to beat his enemy on the battle field.

I would hope that some of our many officers who think of these things, and possess the shrewd common sense of our race, will step out from their characteristic reserve and give us the benefit of their views in this journal.

First as to practical field rifle shooting. No doubt a certain progress has been made in this direction. Our disasters at the hands of the Boers in 1881 brought roughly home to our minds the advantages of good "*field*" shooting as opposed to merely good "*range*" shooting. "Punch" was as usual equal to the situation, and in a cartoon representing an armed Boer presenting himself at the War Office with the words "Does your R. H. require a rifle instructor?" put the whole question in a nut shell. The "field practices" introduced in the last Musketry Regulations are excellent as a step in the right direction, but we want to go a step further, we want to get off the ranges altogether, and to fire not at a standing target, but at such objects and under such conditions as would be met with on service.

There is another point in which I think our system of Musketry education is deficient, I mean its divorce from its natural consort, tactics. How far apart in sympathy and touch are the parade ground and the rifle range! Have not the Adjutant and the Musketry Instructor been always regarded rather as rivals than as allies? It is true that since the abolition of the latter personage there seems some hope of the restitution of conjugal rights between the spirits of the two "divorceés," but no one can say that there is as yet much domestic cordiality: And yet it is imperative that, to obtain the best results from each, they should work together harmoniously.

Perhaps the best plan to show what is in my opinion the true line to be followed is to ask my readers to look through the subjoined prospectus of a "Tactical and Field Rifle Meeting" that I have lately drawn up, and hope to carry out during the coming cool season. I will add a few remarks on each event.

PROSPECTUS.

Tactical and Field Rifle Meeting proposed to be held at Suradavi, commencing on Tuesday the 6th November 1888, open to all troops in the Nagpur Forces, including Volunteer Corps.

The object of the Meeting will be to encourage proficiency in tactical exercises and in practical rifle shooting under, as much as possible, service conditions.

President of Committee and Chief Umpire:

Brigadier-General H. M. Bengough, C. B., Commanding Nagpur Forces.

Members of Committee and Umpires:

Commanding Officers and Adjutants of Corps.
District Staff.

Honorary Secretary to Meeting:

Major A. W. Hill, 2nd Batt. Middlesex Regiment.

1.—*Company field firing.*

Open to Companies of 25 files; British and Native Infantry to compete separately. An attack on a position marked by chatties and screens; 10 rounds per man.

The attack to be conducted under service conditions, 25 per cent. of casualties to be arranged for.

Marks to be alloted as under for a total maximum of 100 marks.

	Marks.
Tactics including dispositions and conduct of attack,	30
Fire discipline, ...	10
Concentration of fire, ...	10
Cover, use made of, ...	10
Judging distance, ...	10
Accuracy *i. e.* percentage of hits on the Targets to rounds fired, ...	30
	100 Marks.

Any attempt to obtain a high percentage of hits by firing an undue number of rounds at short ranges, will be counterbalanced by a forfeiture of marks for tactics.

2.—*Long Range firing.*

Open to sections of 5 files and a Commander of British and Native Infantry, 10 rounds.

British Infantry will fire at	1,700 yards.
Native Infantry	1,200 yards.

3.—*The "Antelope" Purse.*

Rolling Ball, 5 rounds, open to groups of four men of British and Native Infantry, Cavalry and Artillery, at 6 balls in succession. Groups to commence firing when ball first moves, and may continue until it ceases rolling. Any man firing at the ball when still, will cause 25 per cent. of the hits of his group to be forfeited.

4.—*The "Hill and Dale" Stakes.*

Firing up and down hill, open to sections of 5 files, and a Commander of British and Native Infantry, 4 rounds advancing between about 300 and 100 yards at a row of 10 chatties up hill, and similarly at 10 chatties placed down hill. No rush to exceed 50 yards.

Advanced Guard Sweepstakes

A Company of 20 files under an Officer formed as an advanced guard marching between two given points to be prepared to attack an enemy wherever discovered : 10 rounds per man : points as for Company field firing with an addition of 20 for scouting, making a maximum of 120. Open to British and Native Infantry.

6.—"*Woolwich" Plate.*

A half Battery of Field Artillery to be attached to each Company of British Infantry in the "Advanced Guard" Sweepstakes, under the Officer Commanding the said advanced guard, to prepare the way for Infantry attack, and to support the same throughout.

Prize awarded to half Battery which takes up best position and is most effective in its support of the Infantry.

7.—*Lloyd Lindsay.*

Open to teams of 2 files R. A. and 6 files Native Cavalry under a Non-Commissioned Officer who will lead, and may coach his team.

Usual conditions.

8.—*The "Dragoon" Plate.*

Open to sections of 12 files of Madras Cavalry under a Native Officer.

To form at 1,000 yards from a given position, gallop to 300 yards of position, dismount and attack and assault position, firing 5 rounds during the attack. Immediately on dismounting horses to be sent to the point whence advance was made at a gallop.

When position is occupied horses to be signalled for, come up at a gallop, and detachment mounts and pursues enemy for 800 yards.

Marks :—Time 50, Tactics 20, Accuracy 30,—Total maximum 100.

9.—*The "Waterloo" Stakes.*

Sections of 5 files of British and Native Infantry under a Non-Commissioned Officer, to fire 6 rounds by volleys with fixed bayonets at 3 sets of screens placed at 600 yards, 400 yards, and 200 yards, 2 rounds at each distance, in rapid succession.

Marks :—Time 40, Accuracy 40, steady volleying 20.

10.—*Grand Military.*

An obstacle race 1,000 yards over or through 6 obstacles, 2 rounds to be fired immediately after passing each obstacle at a figure target. Open to all soldiers, any weapon, all hits on figure to count 1 point.

Points :—Accuracy 60, Time 40.

Old fatigue clothes may be worn in this race.

Lots will be drawn for order of running.

11.—*The Scout Contest.*

Open to a file of any mounted Corps, to start at about a mile from object (to be settled on hereafter), gallop across country to a point that will be marked by a flag, one man to dismount and fire 5 rounds anywhere between that point and another point similarly marked with a flag, when the other man will dismount and also fire 5 rounds anywhere between that point and one still more advanced. Especial attention to be paid to concealment of men and horses.

Marks, Accuracy 40, Concealment 40. Time 20. Total 100.

12.—*The "Long View" Stakes.*

Judging distance an enemy marked by a hidden section firing a volley of blank. 5 Answers.

Points,—as in Musketry Regulations. Open to N. C. Officers of British and Native Infantry.

13.—*Gunners' Prize.*

To the Gunner or Driver who lays best at the Experimental Target.

14.—*Pool daily (if possible).*

Pool at a moving object (figure of a man) distance 150 yards. Open to all comers, any Military Rifle.

Entries ... ... 2 annas a shot.

A hit on figure to count 1 point. The winner of the greatest number of points each day to receive 6-10ths of pool, the next highest 3-10ths of pool, 1-10th of pool to go to the fund.

15.—*Revolver duel.*

6 rounds to be fired at a figure advancing from 30 yards to 5 yards of firer. 1 contest for British Officers, and 1 for Native Officers.

There will also be Pool at the above practice daily, under the same rules as for No. 12. Entries, 4 annas a run.

16.—*Reconnaissance Prize.*

Open to Officers of any Corps.

A report and sketch of a given tract of country and of a position will be required.

Marks :—Report 35, Sketch 35, Time 30. Total 100.

17.—"*The Rorkes Drift*" *Stakes.*

Defensive night firing. A section of 10 men under a N. C. Officer to fire 5 rounds at 200 and 100 yards at 5 figure targets in the dark.

The direction of the targets will be recognizable only by sound from a tin can being struck behind it; only hits on the figures to count.

Open to British and Native Infantry.

18.—"*Owl and Jackal*" *Stakes.*

Open to British and Native Infantry. A section of 5 files under a N. C. O. will be required to find its way at night from a given point to another.

19.—"*Nightingale*" *Purse.*

Open to soldiers of British and Native Army.

Test, to bind up a supposed fractured limb in the field, 1st with regular appliances, 2nd with improvised appliances.

Points :—	Neatness and correctness	60
Do.	Time	40

Umpire.—Dy. Surgeon-General, or a Medical Officer appointed by him.

20.—*Signalling Stake.*

Open to British and Native Troops of any arm.

Signalling a test message to the Judges, and reading and writing down a test message signalled by the Judges.

Marks,—	Accuracy in signalling	40
	Rapidity	10
	Style	10
	Accuracy in reading	40
	Total ...	100

The same test and prizes for night signalling.

Rules.

1. The troops competing will go into Camp for the Meeting, which will last about one week.
2. Teams from out-stations may compete, and Government will be asked to pay half their railway fare to and fro.
3. Dress for all competions, service order.
4. Entries will be free except for Pool, and Revolver duel.
5. Ammunition to be supplied by competitors, but will be repaid in whole or in part, as far as the funds of the Meeting permit.
6. No aids in shooting of any sort allowed that could not be used on service.
7. The order, and days on which the several events will take place, will be published hereafter.

A. W. HILL,
Major, Middx. Battalion,
Hony.-Secretary.

The prizes given would vary with the size of the meeting and the number of the competitors. Those that were proposed at this meeting are therefore not quoted.

1.—*Company Field Firing.*

We are all I am sure ready to acknowledge the usefulness of this practice, but is it always carried out to the best possible advantage! Is it not rather performed as a rule in a somewhat perfunctory manner. Is much trouble taken to provide varied and suitable ground for each company, and is sufficient attention paid to the tactics of the attack, that is its preliminary dispositions and its conduct throughout its several phases! On the important points of fire discipline, concentration of fire the use and abuse of cover, the judging correct distances, are these sufficiently studied? Does not the practice often degenerate into seeing how many chatties can be smashed at 150 yards. I would hope that the system of marks for the several subjects here introduced, and the healthy emulation which a prize such as is proposed to award should excite, will add much to the practical value of this most valuable exercise.

2.—*Long Range Firing.*

This practice may arouse some feeling of doubt as to its actnal value. I have myself no doubt but that a well regulated long range fire will prove a powerful agent in future wars. If an almost unaimed long range fire proved as effective as it did at Gravelotte and at Plevna, what may we not expect from a superior weapon in the hands of carefully trained marksmen? The question of ammunition is no doubt a difficulty, but not an insuperable one, especially if the long range firing is carried out by the troops of the reserve, which I would venture to suggest should be the general rule.

3.—*The "Antelope" Stakes.*

We come now to *field firing proper*, as I should call it, or firing at a moving object at unknown distances. These rolling balls are intended to represent an enemy advancing on the firers. The balls themselves are about three feet in diameter, made of gunny on some such material covered with canvas. They are started on the side of a hill or steepish slope of ground. and simply allowed to roll towards the firers who may be placed at about 200 yards from the point of starting of the ball. A pit must be dug in the side of the hill to conceal the men who start the balls. The Boers in S. Africa have a similar practice, shooting at pumpkins rolling down a hill.

To show how vast a difference lies between good target shooting and good field shooting, I may mention that last year when showing this practice to His Excellency the Commander-in-Chief of Madras, two sections were selected at hazard from a British regiment which was then the best shooting regiment in India, judged by the standard of "figure of merit," and from a regiment of Madras infantry, which then stood near the bottom of the list of native regiments; the section of the latter regiment made the best shooting at the balls.

NOTE.—I shall be happy to give any further information on this practice, manufacture of balls &c., that any one may desire. It becomes a very popular practice with the men.

The direction of the targets will be recognizable only by sound from a tin can being struck behind it; only hits on the figures to count.

Open to British and Native Infantry.

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[illegible]

[illegible]

4 —*The " Hill and Dale" Stakes.*

This is I think a very necessary practice. Any sportsmen who has been accustomed to hill shooting will bear witness to the number of misses he has had to credit himself with when shooting up or down (and especially down) a steep hill. I feel convinced that the difficulty our men found at Majuba Hill in hitting the Boers was greatly due to this fact. I have in vain asked musketry-wise men in India, and even at Hythe, to give me a rule and a reason to guide me in firing up and down hill, but have been able to obtain neither. A rule I can give, bought by dear experience, and that is that you generally fire over an object when *down* hill, and under it when firing *up* hill, and therefore aim should be taken low in the first case and a little high in the latter, but a reason for my rule I cannot give.

5.—*Advance Guard Sweepstakes.*

This explains itself

The " Woolwich Plate " should, I had hoped, have been a contest for gunners with shell at a moving object, but no ammunition was available.

7.—*Lloyd Lindsay.*

Under the usual conditions, except that the cavalry compete in sections of six files under a non-commissioned officer.

8.—*The " Dragoon " Plate.*

A useful exercise I think, it is practised by some of the cavalry regiments of the Hyderabad Contingent.

9.—*The " Waterloo " Stakes.*

Is intended to represent a cavalry charge.

10.—*The " Grand Military."*

This is, I think, calculated to accustom men to cross a rough country with their arms and ammunition, and to fire steadily when a little out of wind.

11.—*The " Scout" Contest.*

This will prove I think a very valuable exercise for cavalry. I proposed a similar contest for the south of India Rifle Meeting at Bangalore in 1886, but though approved of by the Committee it fell through from some difficulty in procuring a suitable bit of ground.

12.—*The " Long View" Stakes.*

This judging distance practice has been introduced both on account of the near alliance of good judging distance with good field shooting, and as a compensation for the tedium that generally accompanies the drill practice of the former.

13.—*Gunner's Prize.*

I was very anxious that the events of the meeting should be fairly divided among the three arms. With an allowance of shell ammunition this could have been done. There are I think few more regrettable points in our military cheeseparing than the small amount of practice ammunition allowed to the Artillery.

15.—*Revolver Duel.*

It is the custom to depreciate the accuracy of shooting to be got out of a revolver, but I think unjustly. I saw a native officer at one of my last years inspections firing with a government revolver at 30 paces, hit any part of the figure of a man that his Commanding Officer desired him to fire at, for six shots in succession. Our officers as a rule never practice with their revolvers and the result is that they make poor shooting, and as a further result, lose faith in their weapon. I remember when poor Melvill and Coghill of the 24th after saving the colors of their regiment, made their last stand on the Natal side of the Buffalo river, they emptied their revolvers in the body of Zulus who had come and were dancing around them but afraid to approach to close quarters but failed to touch a man. This was related to me by a native who was present.

16.—*Reconnaissance Prize.*

Demands I think no special remarks.

17.—*The "Rorkes Drift" Stakes.*

It should be noted that this is to represent *defensive* night firing; for the attack at night it is agreed that no firing should be permitted, and some authorities even advocate the withdrawal of all ammunition from the men's pouches. The best way, as far as my experience goes, of teaching men to fire effectively at night, when it is impossible to use the sights, with their rifles perpectly horizontal and is to accustom them to fire volleys without even lowering the cheek on to the butt, so that in fact the fire should resemble the effect of a machine gun.

18.—*Owl and Jackal Stakes.*

I think that it may be assumed that night work will form an important factor in the next European war. Its practice has been already introduced into our service, and some such exercise as that here proposed should add a stimulus to the training necessary for all night operations.

The last two exercises call for no remarks.

As regards the few rules entered in the Prospectus. I lay great stress in getting the competitors into camp for the meeting, partly because in this case the ground selected is some 5 to 7 miles from the barracks, but also because I think that an "outing" of this sort is very beneficial in many ways to troops.

Subsidiary rules for the detailed conduct of the several exercises have not been included in the above, but would be required.

I now come to the second point which I have offered for discussion. We have heard a great deal of late years about the *group* system as being the foundation stone of all sound fire tactics, and I think that the truth of the principle that it is sought to instil is acknowledged by all, *viz.* that the control of troops once engaged within the zone of aimed fire must devolve on the commanders of the small tactical units. This unit with us is the section, let us see how far it is suited to fulfil the functions of the continental *group*.

It has been accepted as an axiom that the greatest number of men that one individual can personally control with efficiency in extended order, under fire, is from 8 to 12 men, now taking the war strength of our companies at 80 men we find that a half section just amounts to this number consequently we have at hand a unit which with a little modification exactly answers to the *group*. The establishment of Sergeants and Corporals in a British Regiment is 32 and 40 respectively, which would allow two Non-Commissioned Officers to a section, and a percentage over Of course from this must be deducted the Non-Commissioned Officers for the depôt, for detached regimental duties, and a proportion of sick, and here no doubt a serious difficulty presents itself, but I would hope not an insuperable one. What we want is to have two Non-Commissioned Officers if possible, certainly one, always associated with their own section in quarters on parade, and at all trainings. Is this possible, and if so how can it be best effected is the problem that I would offer for a solution.

In the last number (No. 144) of the Journal of of the R. U. Service Institution is the record of a cleverly written lecture by Major Walter W. M. Smith R. A. delivered at Whitehall on "the Mechanism of the Counter Attack," in which he incidentally but emphatically points out the value of the section as a fighting unit, and urges that the section command should be made a reality in all the details of a soldier's life. He, (as an artillery men) holds up to our eyes as an example of a perfectly autonomous unit, a subdivision of a battery, having its No. 1 at its head day and night, in barracks and in the field. Though recognizing the fitness of the ideal presented by him I fear that the many and various duties that Non-Commissioned Officers in an infantry regiment are called on to perform outside their companies, would prevent sections ever attaining to so high a pitch of independent perfection as that contemplated by the lecturer. Still much may I think be done and I propound the following suggestions as the lines on which I think a movement of reform might be made.

Section Commanders :—

(*a*) Will always call the roll of their sections in barracks and on parade, and inspect their sections and command them on parade.

(*b*) Will be responsible for the men of their sections generally, see that their part of the barrack room is clean, that their beds, cots, and accoutrements are properly arranged, and that their kits, are correctly laid down when ordered.

(*c*) Will attend orderly room with the prisoners of their sections.

(*d*) Will instruct their sections, under their company commanders, at military training.

(*e*) Will command their sections at all Musketry field practices and keep its register at target practice.

(*f*) Corporals of sections to take their meals with their sections and sit as presidents at section messes.

(*g*) Regiments to fall in on all parades by sections and *to be sized by sections.*

(*h*) Men of sections to be detailed as far as possible for guards and other duties with their section commanders.

(*i*) Section "esprit" to be encouraged by rifle matches, games etc.

Let me anticipate a few objections that will doubtless be made to these proposals.

It may be said that—

(*a*) This would necessitate the employment of four Non-Commissioned Officers where one (the company Orderly Sergeant) at present performs the duty ; it doubtless would do so but I think that the advantage in identifying the commander with his section would give ample compensation for the increased labour.

(*b*) This is no doubt carried out already theoretically in many regiments, and practically in a few.

(*c*) The objection and answer in this case would be much as in (a).

(*d*) This would necessitate the careful training of section commanders previously by company commanders, and involves I think the true principle of all military education.

(*e*) A difficulty occurs here from the custom in many regiments of dividing the companies into six sections as being of a more convenient strength for musketry. I do not think that this is necessary, and would discourage it.

(*f*) Another useful means of identifying a section commander with his section ; a chair or stool for him to sit on at the head of his table should be provided.

(*g*) It is here perhaps that the loudest objections will be raised by those of the old school. "What, destroy the symmetry of my companies on parade !" and yet this is to my mind the essence of the whole system of section command. It is absolutely necessary that the unit of sections should be distinctly separated one from the other, when in the field. Major Walker, above quoted, proposes that the flank men of sections should bear distinctive badges on their arms. I think that if such sections were sized from flanks to centre as a company is at present, nothing more would be necessary. And what is there more unsymmetrical in four combined curved lines than in one simple one ; it is a mere matter of custom to which the eye would soon become habituated. I remember the time when the proposed abolition of flank companies was spoken of as certain to ruin the appearance of a battalion. Who thinks so now? This is a change which I advocate very strongly as having a most important bearing on true fire tactics. I may add that I have seen a battalion thus formed and that there is nothing very monstrous in its appearance.

(*h*) This would no doubt be difficult to carry out in its entirety as it would tend to dislocate the duty roster, still the principle might be kept in view and acted on as far as possible.

I append the following brief abstract showing how the *group* system has been adopted by the continental armies.

In the Austrian Army the company, about 240 strong on the war establishment, is divided into four sections, and each section into squads of not more than seven or less then four files.

In the French army the company is divided into four sections, and each section, on a peace footing, is subdivided into two squads and these eight squads are designated by the uneven numbers from 1 to 15.

On a war footing, each of the above mentioned squads is again subdivided into two, and the new squads receive the numbers from 2 to 16.

In the Italian army the company is similarly divided into four sections, the sections into half sections, and the half sections into two squads, provided the half section consists of not less than six files.

In the German army a company for action is divided into three 'zugs' in two ranks. The third zug is formed of what was the third rank, and is called the Tasclier zug. Each zug is divided into two half zugs, and each half zug into sections of from four to six files.

I am somewhat puzzled to know where Non-Commissioned officers are found for so many small units of command. Much of our difficulty in a sufficient supply of commanders would disappear in the field, when married Non-commissioned officers, and those employed in the multifarious duties of barrack life, would rejoin their companies.

In continuation of my letter regarding a proposed "Tactical Rifle Meeting" I have the pleasure to add the following few lines descriptive of its execution which took place near this station last week.

The men I am pleased to say entered very keenly into the spirit of the meeting, all the events filling, and in some, as for instance the "Grand Military" the "Waterloo Stakes" and the "Antelope Purse" the entries were so numerous as to necessitate an extension of the period fixed for the duration of the meeting.

The competition for the "Company Field Firing" was also very keenly contested and the interest shewn in the meeting throughout by all ranks was very encouraging,

The following are some of the experiences that I have gained as regards the meeting.

1st.—I would have no known distances whatever, except for the night firing and the pools.

2nd.—In the company Field Firing I would allot 10 marks, for the manner in which the reserve ammunion is handled and the ammunition collected from the wounded,

In connection with this I would observe that the system of denoting casualties by numbered tickets as advocated by me in a recent number of this Journal was tried on this occasion and found to answer well.

3rd.—I would recommend the rolling balls being made of a diameter of two feet instead of three feet, the dimension we tried. A smaller ball is cheaper and easier to make, rolls better, and is quite large enough for a mark. The Boers fire at pumpkins rolling down a hill.

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PRACTICAL MUSKETRY.

BY CAPTAIN J. G. RAMSAY, *24th Punjab Infantry.*

Some years ago, the old white target with the bull's-eye was given up for British troops, in favour of the present figure targets; the figure supposed to represent that of a man. Strange to say, though the black bull's-eye was given up,—still, save for "attack" and "defence" practices, and the "field" practices, the bull's-eye and centre have been retained.

The idea of the figure target was, I presume, to accustom men to fire at a man with some chance of hitting him, but, if one looks at the targets as now used for individual firing, one sees that a man may make the "Highest Possible" on the 1st and 2nd class targets, and an average of centres on all three classes of targets, without so much as touching the figure; vide Figures attached.

Again, on the 1st and 2nd class targets, the two outside figures are almost wholly outside the centre circle, so bullets striking those figures, (which are supposed to represent a man) count only as outers.

In the army matches, there is a note on the Butt-keeper's register saying that the officer in the butts must sign a certificate that the bull's-eye and centre circles, marked in red chalk on the figure, are invisible at the firing point; but the regulations for the match at the same time allow a spotting disc to be put in the last bullet hole, besides the marking discs being shown on the dummy target!

In pistol practice too, a figure is provided, but a centre of 3 feet diameter is drawn around its middle. It would be a poor satisfaction, when being charged by a fanatic, to be able to put a bullet on either side of him, but that is what we are allowed to do now—and to count 5 points for doing. A man charging at one does not represent 6 ft. by 2, so surely the figure alone is quite large enough.

Now, to teach a man to shoot, in the very first instance, as in the case of a recruit, the old white target and bull's-eye seems to be the best means; you must give a man some definite object to aim at when teaching him: but here again, in our Recruits course, we go far too quickly. The German idea is to teach the young soldier to shoot well at the short distances, and, in his first year, he is only allowed to shoot at ranges of 100, 150, and 200 metres: we teach a recruit to shoot in ten days; on his eighth day he shoots at 500 yards.

No recruit should be allowed to go beyond 200 yards. Till he has made an average of "centres" up to that point, or allowed to be considered a "trained recruit," till he has made at least 10 over "hits" in the whole course.

Once a man has become a "Trained Recruit" I would never let him see or fire at a bull's-eye again, except in match shooting.

I would divide the figure targets into three parts; hits counting as follows:—centre of body 4; head 3; legs 2; all ricochets on figure to count in full on the part of the figure on which they strike.

The individual firing of the annual course I would cut down to three distances, 10 rounds at each—namely 200, 400 and 800 yards. Individual attack and defence practice, 10 rounds each, hits to count 2 only.

Men making an average of hits on the figure at these distances, to go on with the rest of the course; if not, to be put through the individual again.

Men making 130 points to be marksmen.
Ditto.... 120 points „ 1st class.
Ditto.... 100 points „ 2nd class.
Men below 100 points „ 3rd class, and to be put through the practice again.

The rest of the course—

Independent firing, fixed sights, 10 rounds at 300 yards at a "head and shoulders" target, one to each file, vide figure attached.

Volleys at figure targets, but hits only on the figure to count; 10 rounds at 400, 600 and 800 yards; all fired on one day, and a per centage of 50·00 to be insisted on for the whole practice: at 400 yards the target to have "head and shoulders" only on it.

Vanishing Target	10 rounds.
Skirmishing	10 rounds.
Field Firing	30 rounds.

Long range firing to be only carried out by marksmen: it is a mere waste of ammunition making bad shots fire at long ranges: long range firing I should limit to from 900 to 1,200 yards.

As for the moving object, that is a most precarious kind of shooting, and no man can remember the distances laid down in the regulations to fire ahead of the moving object, even if he could judge the pace at which it was moving, or the distance he was aiming ahead of it, it must remain a matter of judgment.

In shooting for the annual prizes, I would use bull's-eyed targets, and moreover Wimbledon ones; and also in every way encourage men to fire matches among themselves, and also to enter for the public rifle meetings.

In our present course of Musketry, we have no practice in firing off any great number of rounds at one time, such as would have to be fired away in an action of any importance. For this reason, I would advocate 30 rounds being fired in volleys in one day, and not less than 30 in Field Firing.

The firing a number of rounds no doubt affects the nerves of the firer, and moreover, if the rifle is not well held into the shoulder the recoil in time will bruise the shoulder very considerably; the rifle gets hot, and unable to be held firmly:—(I have seen one regiment on service with sheepskin round the "point of balance" of the Martini-Henry, so that the rifle, even when heated, might be well held into the shoulder:—This appears to me an example which might with advantage be followed by all regiments.)—The smoke affects the eyes of the firer; and the general result is that we do not get nearly the same result as we should do, if we fired the 30 rounds by 10 at a time. But in this, as in all practical work, our only hope is to habituate men in peace times to what they will have to do in war, and thus cause it to become a second nature to them. Mayne says, on page 4 of his Infantry Fire Tactics:—"It cannot be too strongly urged that the requirements of a battle govern the use aud practice of infantry fire, and it is essential that this should be the controlling element of any musketry regulations, which are intended to be of use in the field."

As to Field Firing.—The attack on an enemy, entrenched, with the approach to his position over an open plain, is the worst case we ever hope to be placed in, so let us take that as a pattern. The position should be made up as much like reality as possible, and the enemy represented by screens, etc., showing a force slightly inferior to the attacking force: let the firing line be as much under cover as possible, the divisional artillery in its proper place in the line, commanding the approaches, and the supports and reserve *under cover*,—not represented by high screens to catch the bullets, and thus increase the figure of merit. The general reserve, some 600 yards from the firing line might be represented by bigger screens, to show the effect of the bullets which miss the first line.

In cantonments where artillery is stationed, the artillery might co-operate with the infantry, opening fire at 3,000 yds. (with an infantry escort as usual) on the artillery of the defence.

The infantry extending at 3,000, would then advance as directed in the memo for the new attack, and a company of marksmen might, if the ground was favorable, be sent on to within some 1,200 yds. from the position to open a long range fire on the position at that range; the artillery if possible moving up to a nearer range-some 1500 to 1200 yds. under protection of the advanced marksmen company. At 800 yds., when the general firing line opens-fire by volleys, one volley might be fired by alternate sections at each 50 yds. or up to 500 yds. or 6 rounds.

At 500 yds. the firing line should be at once re-inforced, and the rushes made by alternate half-companies or 9 rushes of 40 yds. up to 150 yds. from the position, expending 9 rounds,—or 15 rounds in all; leaving 15 rounds to be expended in slow independent firing at 150 yds.

Between 500 yds. and the position, screens might be placed on the flanks, hidden if possible from view till the line comes within that distance, to represent a counter-attack—this to be repulsed by the fire of the reserves or perhaps the second line.

In rear of the position, larger screens might be placed en echelon, at 400,600 and 700 yds., to represent a retiring enemy, at which the second line might fire on coming up. The third line might be imagined in Field Firing.

What we want is some idea of the real result likely to be obtained on service—not a fictitious per centage of hits. The French and Germans consider 10 per cent in peace times, and 1 per cent on service not a waste of ammunition.

With regard to volley firing, we want more attention paid to the non-commissioned officers; on their words of command depend, almost entirely, the goodness or badness of the volley. If the word "fire" is given with the slightest hesitation, or on the other hand too sharply, the volley is sure to be spoilt. Fire discipline depends as much on the word of command as anything else, more especially with native troops, where in fire discipline parades, or on any drill parades, the men move exactly as the word of command is given. The slightest uncertainty in the voice, and the same uncertainty will be seen in the movement.

Another very important point in collective firing is that every officer or non-commissioned officer giving the command to fire a volley or so many rounds of independent firing, should, previous to giving the number of yards, *distinctly* point out the objective; it is no use pointing to a line of wall, and telling men to fire on that wall, it must be on some mark on the wall, a gate, a door, in fact something quite definite, which no man can mistake.

The men should be taught *never* to bring the rifle to the "present," without the eye and aim being fixed on some object.

Another very important thing to see to in going through the motions of volley firing, without any sort of ammunition, is, I think, that the men at once remove the empty cartridge when the volley is finished, and on the word "ready" carry their hands at once to the expense pouch, and go through the full motions of taking out a round, and placing it in the chamber. One notices time after time when the order for more than one volley is given, the men will close the breech on the word "ready" without any attempt at the motions for putting in a cartridge. The result being that, when firing blank or ball cartridge, there is very often a delay in the "ready" motion, and very frequently the volley is spoilt by one man or more being behind hand. A smart non-commissioned officer, by watching his men, can always tell the exact moment to give the word "fire," but this requires practice and strict attention, not to say interest in the result.

Now, as to firing in the attack formation, or, more strictly speaking, firing as on service, to obtain the greatest result from one's fire. In the new attack, 500 yds. is recognised as the point at which the line will suffer most, and it is, on the other hand, (which is far more important) the point from which the enemy will begin to suffer too. At this point re-inforcing begins, but it seems to me that instead of the re-inforcement *beginning* here, the supports ought to be brought up into the firing line *in any case* at 500 yds. to get as many rifles as possible in the firing line; there will have been many casualties before the 500 yds. distance is reached,—quite enough to enable the supports to be brought up: besides, it is a mistaken policy to wait till casualties thin the line too much, and the idea of the supports having been kept out of the firing line till now is lost. We are told that re-inforcements are to fill the gaps, but the real idea of them is lost. It is, I think, that until we reach a point where there is a reasonable hope that the enemy may be made to suffer from our fire, we keep as many men out of the direct fire as possible. The support line will suffer too to a great extent, but the attention of the defenders will be taken up with the firing line, trying to subdue their fire. Of course the flatter the trajectory of the defender's arm, the greater the loss in the supports. Now, with the Martini-Henry, fired with the 500 yds. sight, the Dangerous Zone is 85 yds. but, owing to the ricochet, the Dangerous Zone will be equal to the Dangerous Zone plus one half the Dangerous Zone, or $85 + \frac{85}{2} =$ about 128 yds. therefore the support should be at least 120 yds. in rear of the Firing line when at 500 yds., if they are to be kept there at all. At 400 yds. the D. Z. is 95 yds. D. Z. + ½ D. Z. $= 95 + \frac{95}{2} = 143$ yards: the Dangerous Zone goes on increasing as the distance decreases. But the supports, reserves, second line and third line ought all to be drawing nearer the firing line at this period.

It seems to me then that, irrespective of getting more rifles into the firing line at 500 yards, where one hopes to begin to knock the enemy about, it is far safer for the supports to be with the firing line, where they will be able to use their arms, and help to keep down the fire of the enemy, instead of acting as bullet-catchers, behind the firing line.

With regard to the reserve, and second and third lines, the argument in favour of *their* not suffering so much is, I think, that the more rifles one gets into the firing line, the more will the attention of the defenders have to be paid to that firing line, and they will not be able to neglect it, and turn on the reserve and other lines.

As regards the sighting to be used—there are two sights of the Martini-Henry rifle that are easily remembered; the 600 yards with the flap raised, and the 400 yards with the slide at the top of the bed. Unfortunately the rifle is sighted for a fine sight, and what man, even at 600 yards would be able to take a fine sight in action? The excitement of the action, the dust and smokes, not to speak of the shaking of his hand from the exertion of running, the recoil of the rifle, etc., would make it quite impossible to use a fine sight. Or to take another instance:—The charge of a body of cavalry.—What man, in the haste needed to drive off such a charge, could be careful enough to ensure taking a fine sight? In our Cavalry Regulations, the cavalry soldier is taught that infantry, as a rule, fire high. Why should not the 500 yards sight be used from 600 yards and the 400 yards sight from 500 to 300 yards and after that the regulation fixed sight or 200 sight? I do not suppose for an instant that men will be found cool enough at 300 yards to put the sight at 200 yards, but the slide might be dragged down some where about half-way down the bed, and would be quite good enough: the aim throughout taken at the foot of the object. No orders need be given about full sight or fine sight; we may be quite certain that the former will always be used in action, and, if in action, why not in peace manœuvres and practice?

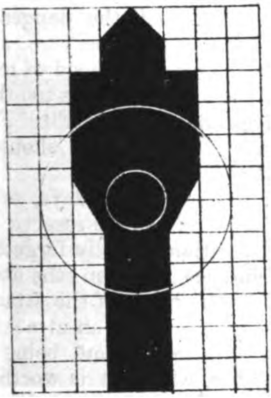
Beyond 600 yards we might use the sighting of our rifles for the distances, but keeping the slide down about 50 yards below the distance named; always remembering to fire low, and that the dangerous zone is equal to the dangerous zone + $\frac{1}{2}$ the dangerous zone.

When acting on the defence, there is more likelihood of men using a finer sight, any how at the longer distances, though here too the advice about firing at the foot of the object given in Mayne's Fire Tactics is invaluable; for the defence "Fire low, Fire slow" should never be forgotten.

A mistake one often sees committed during field days, and a very natural one, I think, too, is that the defending force reserve their fire till the attacking force draws near the position, totally forgetting that it is in this very particular that the difference between the attack and the defence lies. Unless the latter breaks the heart of the attack before they arrive within striking distance, they are lost: an attacking force allowed to come within 500 yards, of a position without being made to suffer very great loss indeed by infantry fire, will, if it is worth its salt, get in. And moreover, the long range fire of the defenders, if the defence is well planned should be very deadly owing to the distances having been previously ascertained, by the range finders or other means.

This mistake of waiting for the attackers to get near the position, is, I think, the result of a desire to spare blank ammunition, of which so few rounds comparatively are available, but it is far more important that the blank ammunition be used at the longer ranges, even if none remain for the shorter ones; so that the attacking force may appreciate better the difficulties they have to contend with.

Another point with regard to the Defence is that one frequently sees positions badly taken up, owing to the fact that the increased *accurate* range of the breech-loader is not sufficiently appreciated. The fact is, that a man, with lots of ammunition at hand, and posted behind cover, is in a very different position to a man advancing against him, and more or less in the open; and consequently a cross fire can be brought to bear on parts of the chosen position, which is more deadly than a direct fire of troops posted in rear of the same parts, and thus many men may be spared to be used either at the more important places, or in the equally important place of the Reserve.



3RD CLASS TARGET
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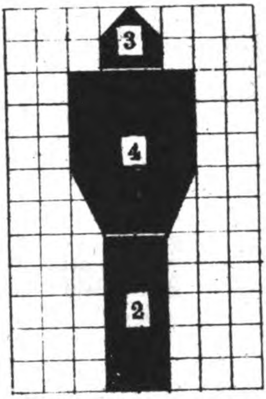

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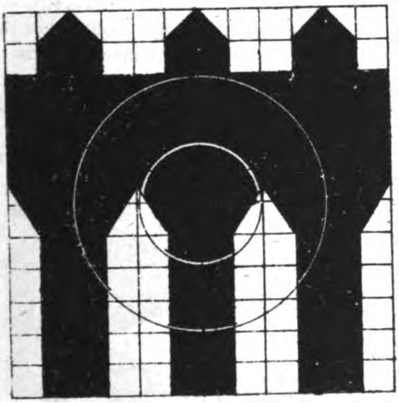

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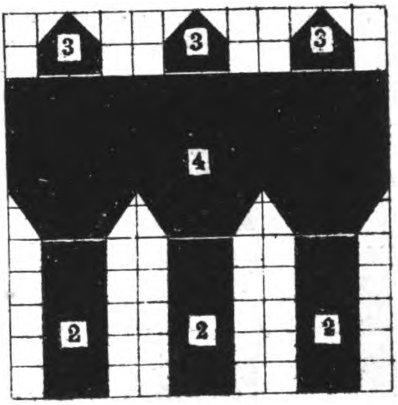

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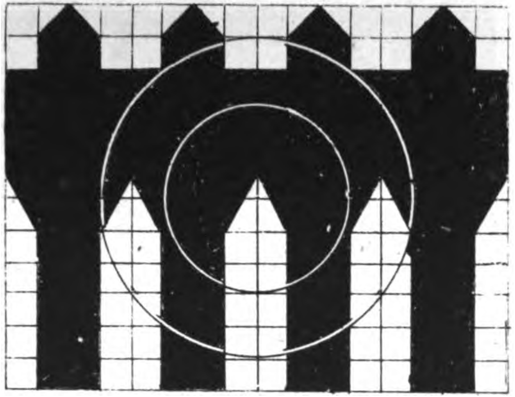

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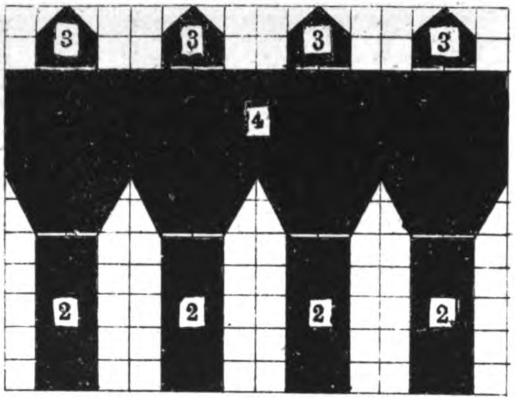

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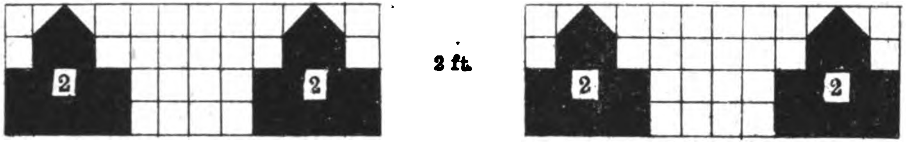

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CAVALRY AND INFANTY FORMATIONS AND TRAINING.

By Captain V. U. Stockley, *16th Bengal Cavalry.*

The following remarks are made in the hope of promoting discussion on a few important and interesting points.

I would like to know the arguments and opinions of other officers for or against the ideas set forth.

CAVALRY.

Cavalry to be formed in single rank.

A squadron to consist for field work of four divisions, each having a front of not less than twelve or more then twenty men. A squadron in line would then have a front of not less than 48 yards or more than 80 yards, all field movements to be executed by divisions, not fours, as a rule.

The men to be told off in fours but this formation to be used chiefly for column of route or for passing through places too narrow for division front.

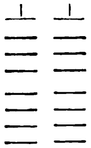
Ground scouts, signallers, pioneers, and men in excess of front required, to be placed in serrefile rank.

The use of markers for field movement to be abolished

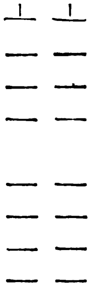
Interval of division front between squadrons in line.

A squadron column would be in column of divisions.

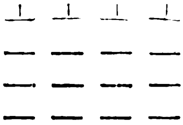
Formations would then be as in following sketch.



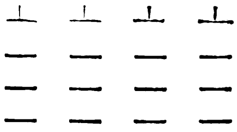
Regiment in close double column.



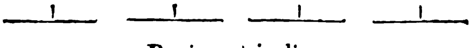
Regiment in open double column.



Regiment in line of squadron columns at close interval.



Regiment in line of squadron columns at deploying interval.



Regiment in line,

Each man to be armed with lance, sword, revolver, and carbine. This would make the men confident and bold in reconnaissance, and detached duties, and there is no question of the superiority of the lance on the battle field.

The pioneers specially trained and equipped for destruction of railways, telegraphs &c., to be armed only with sword and revolver.

Cruppers and breast-plates to be done away with in the native cavalry, men could then saddle their horses very quickly. Standing martingales to be used for particular horses requiring them. Men to ride with heavy bit and short stout single rein with lash end. Nothing can be worse than to encumber men with double reins.

The many advantages of single rank are well known, such as superior ease and rapidity of movement whether on good ground or bad. Simplicity in training. Cavalry could be trained in a much shorter time to single than double rank.

Greater extent of front and number of lines, whereby two hostile bodies of cavalry of equal numbers meeting, one being in single rank the other in double rank. The one is single rank could out-flank and envelop the one in double rank.

Dismounted work could be easily and quickly performed, and necessity for mounted infantry done away with.

As to training the chief points are of course plenty of practice in long advances and alterations of direction across country, with ground scouts and reconnoitring groups out, and in executing the different modes of attack. Cavalry by this becomes accustomed to passing obstacles and broken ground, and the passage being effected, quickly resuming its previous formation. The pace should not be slower than that laid down. The trot should not degenerate into a jog nor the gallop into a canter. Breaking up after an attack and rallying wherever required. Squadrons and regiments to be at times mixed up after attacks, and accustomed to rally quickly in any direction.

This sort of practice accustoms the men to look towards their leaders, and attend to their signs and actions.

Practice in out-post duties, reconnaissance, time and distance marching, the crossing of rivers, and dismounted work.

The men to be thoroughly trained to the use of their arms. This point is probably not thought half enough about in the native cavalry. In most regiments the men have very few opportunities of practising the use of sword or lance. An occasional assembly for tentpegging or lime cutting in which comparatively very few men take part, is all.

Even in regiments which make a point of practising these exercises they are only voluntary. Perhaps a hundred, possibly even two hundred men of the regiment assemble to take part in them on the day fixed, but the greater number of men never practice them from one year's end to the other. If the men can go through the lance or sword exercise no more is required of them. In a lancer regiment it is a question if the majority of the men ever draw their swords except to clean them, and yet a lancer must fall back on his sword if his lance breaks: this should not be. Every man should be regularly practised in tentpegging, lime cutting, mounted combat with sword and lance, and any other varieties of exercises that would accustom him in time of peace to handle his weapons with ease and dexterity, so that on first meeting the enemy he would have confidence in himself.

Actual fighting is of course the best school to teach a man the use of his weapons, but that is no reason why he should not be made as expert as possible with them in time of peace so that he will start on a campaign with every advantage that peace training has been able to give him.

If there are any who, not having been at close quarters with an enemy, doubt the importance of this subject, let them wait till the day when they happen to lead their men in amongst an enemy. If the enemy is skilful and their own men not so, they will find themselves punished enough for any neglect in their individual training.

It cannot be expected that men who have never done anything more with their swords than draw them on parade, or occasionally go through the "sword exercise" with them, can know how to use their swords with effect against an enemy in actual fight.

The "sword exercise" is most useless unless combined with other exercises of a more practical nature.

We have courses of squadron training and musketry through which very rightly every man has to go. In the same way every man should have to go through exercises calculated to make him a good swordsman and lancer.

First, as a recruit he should be thoroughly trained to all these exercises. He should not join the ranks till besides being a good horseman he is also a good swordsman and lancer.

If he cannot become so, he should be discharged. Having joined the ranks he should be obliged to keep up his skill.

It might be done in this way—

Each squadron to have its own run for tentpegging and lime cutting, its own rides, and its own ground for the practice of mounted combat.

All the squadrons to parade once a week under their commanders, on a day fixed.

Every available man to be present, the reasons for absence being shown as on the diary of squadron training.

One week the practice might be tentpegging, the next lime cutting, the next mounted combat, the next riding school and lance and sword exercise, each man afterwards practising the various cuts and thrusts at a canter on limes and rings set up at different heights at the corners and other parts of the rides.

Each morning work to finish up over the jumps (which should be of a greater number and variety than are generally seen) going as often from one direction as the other. Marks to be given in the individual exercises and a certain number of prizes per squadron given at the end of each month to the men with most marks during that month. This to be carried on throughout the year when in cantonments.

INFANTRY.

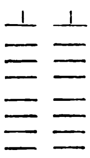
Infantry to be formed in two ranks as at present.

A company to consist for field work of not less than 80 or more than 120 files, divided into four sections.

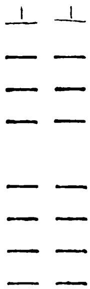
A battalion to consist of four companies. Movements to be executed by sections and fours. Interval of half section front between companies in line.

A company column would be in column of sections.

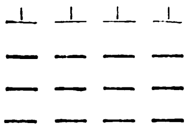
Formations would then be as here sketched.



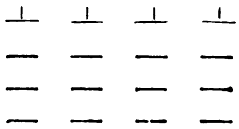
Battalion in close double column.



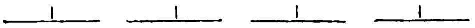
Battalion in open double column.



Battalion in line of company columns at close interal.



Battalion in line of company columns at deploying interval.



Battalion in line.

The question of the formations infantry should now adopt when engaging an enemy equal to itself in arms and training, is a vexed one.

It will probably be found that the simple formation of line is the best for good infantry whether in attack or defence.

A hundred different "forms of attack" have been proposed.

Principles, however, and not forms, are what we want, and after all the writing and talking of late years on this subject, the fact remains that nothing more has been arrived at than that infantry must now attack in successive lines, so that when the front line is brought to a stand still by the fire of the enemy, another line will come up in time to carry it on nearer the enemy, and so with the next line and the next, until by these successive reinforcements a thick line has been pushed up to the enemy, and assaults his position.

It is a question however if some of the lines might not be with advantage in lines of small columns at deploying intervals, when advancing to attack. Supposing five or six lines to go forward against an enemy's position. The first and second might be in line, the first line covering its advance if necessary by sending forward a section per company in extended order. The remaining lines in lines of small columns at deploying intervals. For it is certain the enemy's rifle fire would be all directed on the first or firing line, whose return fire and smoke would cover the small columns of the lines in rear from any aimed fire of the enemy. These small columns on coming up to the firing line, would be more likely to carry it on towards the enemy than a simple two deep line, and they would form compact bodies for the assault.

Lines of small columns would advance with more ease and less chance of confusion than long two deep lines.

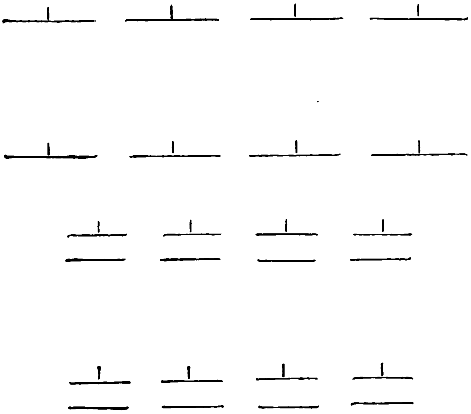
These columns should of course not be deep ones, not more than four ranks deep.

With the new formations here proposed, they might be company columns having a front of half a company or two sections.

Such columns could quickly form line when necessary by deploying outwards, the two sections in rear coming up on the right and left of the two leading sections.

The following sketch shews a brigade of four battalions attacking in this manner in four lines—a battalion in each line—distance between lines about 400 yards.

The brigade is supposed to form part of a division, and to have other brigades attacking on its right and left.



1st battalion in line covered if necessary by one section per company in extended order.

2nd battalion in line.

3rd battalion in line of company columns (of front of two sections) at deploying interval,

4th battalion ditto

Another formation for the brigade would be for the first and second battalions to each form two lines, two companies in first—two companies in second line. The two battalions attacking side by side.

If the enemy makes a strong resistance there must be a great intermingling of companies and battalions. There is no way out of this. It must be recognised as inevitable. Therefore in peace manœuvres, brigades with all their battalions mixed up after an attack, should be constantly practised in quickly reforming in whatever formation may be required.

Major Young in his Prize Essay considers that the difficulty of intermixture of units may be got over with our present small companies by reinforcing the firing line by entire companies brought up into gaps. The line would then become a line of independent companies. But would such large gaps always be found when wanted, and even if they were would not the men inevitably become mixed to a greater or less extent during the advance under heavy fire—crowding and other causes.

Supposing for instance the firing line in an attack is brought to a standstill by the enemy's fire. It is all important that the next line come up to reinforce and carry it on. It cannot afford to wait until gaps of the size required occur in the firing line. There may be convenient gaps or there may not, but in any case it is absolutely necessary to reinforce and push on the attack as quickly as possible. Also, as far as I can understand, Major Young does not think the companies will at any time be so crowded during the attack as to oblige them to assume a deeper formation than two deep.

As however it is now considered necessary to put about eight men per pace into the attack on a well posted enemy, it is not clear how a line only two deep (that is with a density of about two men per pace) is to be brought up to the enemy's position.

The average density must of course be much greater, probably three or four men to the pace previous to the final reinforcement, and four or five men to the pace for the actual assault, even after suffering very heavy losses.

I may however have misunderstood Major Young in this particular.

The long range fire of separate covering parties to aid the attacking battalions is often recommended. It could of course be carried out with a force acting independently, such as a division or brigade, but it is not clear how covering parties are to be made use of by a division or brigade when attacking with other divisions or brigades to the right and left. For these covering parties must as a rule take up their positions a little outside the flanks of the attack, and if there were other bodies of troops attacking side by side with their own division, they would get in the way of these troops. It seems to me, that on the whole the leading or firing line of the attack must do the covering fire for the attack, and take part in the assault as well, because in many cases there will not be any room or place to put special covering fire parties.

Would it not be better to abolish long range rifle fire in attacking, unless there are some special favouring circumstances, and make it the rule for the leading line to get as close as possible to the enemy without firing. Even in the defence only certain sections of the line should open fire at long ranges, and then only by careful volleys. It should be the rule for the greater portion to reserve its fire till the enemy get within 400 yards, and then commence "independent firing."

No sights should be put up or down. The fixed back sight only should be used, both on the range in peace time, and in the field against an enemy, for all distances up to 450 yards: 500 yards in fact should be the first distance necessary to put up the back sight for. The men would then become accustomed to using the one fixed sight for all distances under 500 yards, by getting a little more or less elevation as the distance varied under that range.

It is impossible to expect men to remember to adjust their sights for varying distances in the heat of a close fight. Neither then should they be required to do so on the rifle range in peace practice. They would then become skilled in using the fixed backsight for the short ranges.

The question of large companies or small companies has been much discussed. It is owned that the battalion is now too large a tactical unit—but is not our company too small a one?

A company of 100 to 120 files of four sections seems the best tactical unit. It is like a small and handy battalion. At present our battalions have no formation that they can readily adopt from which line can be quickly formed.

The line is usually deployed from a battalion column, which takes a long time, or it may be from columns of half battalions which is quicker, but not so quick and convenient as from a line of company columns at deploying intervals—the companies being large—four to a battalion.

LETTERS ON STRATEGY.

LETTER 4.

The Prussian dispositions from the 8th to the 13th October.

Before I proceed to examine the measures taken by the Prussians between the 8th and 13th October, I must beg you to revert with me once more to the deliberations that took place at Erfurt on and after the 14th October.

These deliberations were under the presidence of the Duke of Brunswick and in part in presence of the King.

Their outcome was the decision to give up all thought of an offensive for which it was too late, and to take up a concentrated position behind the Thuringer Wald, for the purpose of falling upon the enemy when he advanced. I mentioned this result (of the deliberations) before * * * but what I must recur to is the circumstance that these deliberations are proof of what fatal consequences follow a council of war.

The decision come to was in itself according to the position of affairs at the time not a bad one. But the fact that the difference of opinions came to light at all, that none of the suggestions put forward were definitely adopted, that the resolution taken was to a certain extent a compromise, confirmed each in his own opinion and awakened in him the belief that he finally would carry his plan.

The Duke of Brunswick was of opinion—and no one now will say he was wrong—that Prussia would be worsted in the war. For this reason he wished to prevent the war altogether. But he dared not express his thoughts in view of the humiliations that Prussia had suffered. Deceived by the diplomatic reports, he believed Napoleon did not desire war, at any rate wished to avoid the appearance of being the aggressor. If then Prussia remained on the defensive, the Duke hoped yet for an avoidance of hostilities and for a friendly arrangement. What a man wishes, he hopes for and gladly believes in.

The King had clearly recognized that war was inevitable. He was however convinced that the time for the offensive had passed. He judged Napoleon correctly in believing that he would not lose a day merely for the sake of playing the part of a lover of peace. That under such circumstances a concentrated position was the only course to take in order to fall upon the enemy with combined strength, however and wherever he should appear, no one will gainsay.

The Prince zu Hohenlohe's idea of advancing to Hof so as to hold a direct line of retreat and not to be separated from Saxony from the very commencement had much to recommend it, especially if it had been carried out before Napoleon could interrupt its execution.

But the harm was that all the divergent views in the Council of war to a certain extent found favour. The Duke of Brunswick preserved the hope of preventing the war, if he could only hinder the Prince zu Hohenlohe from taking the offensive. The Prince zu Honenlohe had been granted the concession of being allowed later to cross the right bank of the Saale and of pushing forward, if the enemy should attempt to turn the left wing of the Prussian army there, and at the same time it was agreed that this probably would be Napoleon's plan. The King wrote to this effect to Ruchel on the 7th October. No wonder that the Prince zu Hohenlohe constantly had in view the passage to the right bank of the Saale and took measures and issued instructions to that effect. We shall see that the defeat of the 10th October [Saalfeld] and the frustration of a brilliant partial victory on the 13th October were the consequences of this conflict of opinion.

There were on the 4th and 5th October assembled at Erfurt the men who were considered the most capable not only by the King but also by the whole army. Brunswick, Hohenlohe, Ruchel, Mollendorf, were the most trusted leaders, Phull and Massenback were in the opinion of contemporaries the first authorities in military science. Kleist, Scharnhorst, Rauch and Muffling proved later that the choice was a correct one. And yet the consequences of the Council of War were fatal. No Council teaches us better than that at Erfurt on the 4th to the 6th October that a Council of War never should be held.

On the 8th October fairly correct news of the enemy was received at the Grand Head Quarters. Muffling reported that the French army was moving from the neighbourhood of Bamberg in a north-east direction and made the suggestion of falling upon it with cavalry in flank and rear They heard that Coburg had been surprised in the night and that Napoleon was expected at Kronach. The movement that the King had foreseen in his letter to Ruchel of the 7th October became a certainty. Napoleon was marching straight upon Berlin and threatening to turn the left wing of the Prussian army.

The measure to have taken to meet him from a central defensive position was a concentration towards the left wing and then an attack upon the left wing of the enemy's army towards his left flank.

We see that the dispositions of the Grand Head Quarters on the 8th October accord with this plan. The only fault that Hopfner finds, perhaps justly, is that too many troops, particularly infantry, were diverted for the minor object suggested by Muffling and that consequently 11,000 men were withdrawn from the main army. If one is but half as strong as one's opponent, there is undoubtedly double reason to grudge every man that is detached and withdrawn from the main battle. For one can never be too strong for a decisive battle. (Compare the dispositions of the Prussian generals for the battle of Koniggratz:—"The co-operation of the whole of the Prussian forces which had crossed the Bohemian frontier to take the offensive, seemed fully assured." No troops were detached towards Josephstadt and for observation although it was not known whether a part of the enemy's army was not lying behind the Elbe in the line Josephstadt—Koniggratz.)

In fine, the orders for the 8th October were that the main army was on the 9th to move to the left and on the 10th to concentrate in the rayon Kranichfelt, Tannroda, Blankenhyn, Magdala; the army of the Prince zu Hohenlohe was to occupy the bank of the Saale between Cahla and Rudolstadt and from Hochdorf; the corps of Ruchel and

Eugene of Wurttemburg were to draw in to the main army. These measures made it possible to cut up the left wing of the French army, Lannes or Angereau or both, on the 11th or 12th October.

But we fail to discern on the part of the subordinate general's initiative and co-operation on the 9th October in carrying out this disposition, least of all in the army of the Prince zu Hohenlohe. This was the first result of the Council of War, at which the idea of Massenbach and the Prince to advance on the offensive along the right bank of the river was not merely not decidedly thrown out but was eventually approved. Both therefore saw in the movement that was ordered, not a concentration on the left bank of the Saale but the introduction to the passage to the right bank by the whole army. Colonel von Massenbach was so convinced that the crossing of the whole army to the right bank could alone save the Fatherland, that he was determined to carry Hohenlohe's corps across and to compel the main army to follow, even if this were not part of the plan of the Commander-in-Chief. He did not impart this to his general, knowing his habit of obedience. He merely represented that the dispositions in orders could have no other object but to cross to the right bank with the whole of the forces.

Consequently it was not thought necessary in Hohenlohe's head quarters to concentrate on the 9th at Hochdorf. What was the use of bringing the Saxon troops over first to the left bank of the Saale, if the intention was to advance them after the 10th October along the right bank. The Prussian troops also of Hohenlohe's corps were left in their cantonments round Jena, because they could be quickly concentrated in case of need from that place on Hochdorf on the 9th and reach Rudolstadt and Cahla on the 10th.

* * * * * *

If we ask ourselves whether the Prince zu Hohenlohe was justified in deviating in this way on the 9th from orders received, it must be admitted that it is the duty of every detached commander, in any case of the commander of a corps or of an army, to modify the execution of his orders, if circumstances demand it upon the spot, in order to conform with the intentions of the Commander-in-Chief in the shortest and best way. The question then is only whether the Prince was justified in assuming it to be the intention of the supreme command to cross over on to the right bank of the Saale. After what passed in the Council of War at Erfurt, this question cannot be absolutely negatived. The Duke of Brunswick wrote on the 9th October to the Prince in answer to his report on his dispositions. "It is by do means the intention to await the enemy on this bank of the Saale" In my opinion therefore one sentence is lacking in the directions which were issued on the 8th October by the Grand Head Quarters, at the beginning of the order as to disposition, which would have left the subordinate generals in no doubt as to the intentions of the supreme command. This sentence ought to have run thus. "The main army and the army Hohenlohe are to concentrate on the 10th October between Kranichfeld, Taunroda, Blankenhayn, Magdala, Rudolstadt, and Cahla on the left bank of the Saale in such a manner that they from this post may be able to attack the enemy with combined forces, wherever opportunity offers."

If some such clear directions had gone before, it might have been reckoned as disobedient of the Prince zu Hohenlohe that he left the Saxons on the right bank. He could not even have dared to do so. Massenbach could not possibly have dreamt of directing on to the right bank the whole huge apparatus of trains &c. which later caused so much confusion and mischief, if it had been known to him that the operations were to be from a concentrated position on the left bank. All the unfavourable circumstances which subsequently brought to pass that the ration transports missed their destination and the troops starved, are to be ascribed to this uncertainty and suspense.—If you compare the directions of the supreme command on the 8th October with the dispositions, instructions and the orders which were issued in our army in 1866 and 1870-1, you find that in the latter case always, even in minor instances, they began with the "general idea" in the formula, (1) I purpose—(2) accordingly I direct.—This merely clerical matter is of the utmost importance in Strategy.

On the other hand as regards the design of Colonel von Massenbach to draw the main army over unto the right bank of the river by means of the movements of Hohenlohe's corps, in spite of what might be the will of the Commander-in-Chief, must be most emphatically disapproved. The subordinate general may, as long as he is through distance made independent of the Commander-in-Chief, depart from the orders he has received only so far as circumstances upon the spot differ from the circumstances as foreseen by the Commander-in-Chief, and his independent departure agrees with the general intentions of the Commander-in-Chief made known to him. * * * The subordinate should never dare to act against the expressed will of his chief, to attempt to force him to a change of plan. Only in full and hearty co-operation with the ideas of the Commander-in-Chief can the subordinate general see his own success. If the latter attempt to invade the former's province, he is guilty of reprehensible and dangerous presumption. Such a piece of presumption would never have occurred to Colonel von Massenbach at all, with all his inclination thereto, had he with his General not been dragged in to the deliberations at the Grand Head Quarters, but had only received orders and directions. One evil consequence of a Council of War.

* * * * * *

On the 8th Tanentzien was hard pressed by the enemy and in the evening, after some not altogether unfavourable rear guard skirmishes, reached Schleiz, from which place he reported to the Prince zu Hohenlohe.

The 9th October.—The correspondence between the Prince zu Hohenlohe and the Duke of Brunswick * * * corroborates the idea that the Prince still held fast on this day to the opinion that the Commander-in Chief purposed to adopt his suggestion and push forward over the Saale. He framed all his dispositions accordingly. Prince Louis Ferdinand in particular was instructed to this end, while a part of the Saxons on this very day, the 9th, were directed to the road between Durren, Ebersdorf and Mittel-Pollnitz, and orders were issued to the Prussians troops to cross the Saale on the 10th and advance towards Mittel-Pollnitz.

About mid-day the Duke wrote the letter in which he said, it was not at all his purpose to await the enemy on this side of the Saale. I have already observed that the Prince saw and might well see in this a corroboration of this idea that a passage over the Saale was first of all in view. The Duke to be sure went on to say, that he left it to the Prince to draw the Saxons to himself and wait for the main army, before he began his movement over the river. But the Saxon troops already stood on the further side. It was natural to consider their marching backwards and forwards useless. Meantime there came in General von Tanentzien's favourable report on the first part of the action of Schleiz. On this account the Prince, as far as the Prussian troops were concerned, abandoned the passage of the Saale and disposed the Saxons as a somewhat necessary support to Tanentzien. For, even if this General up to the time of his report was still victorious, it was yet probable that the advancing enemy would reinforce himself and that Tanentzien would stand in need of support by fresh troops.

In the meantime Massenbach had reported that between Cahla and Rudolstadt no point of rendezvous for the army was to be found. According to our modern ideas it is incomprehensible how such a report could be believed in. But even according to the ideas then held on campaigning, by which great wide open plains were required for a camp, the report is surprising, for the gist of the order was not to pitch a general camp there, but only to occupy the ground with the troops. These might have been distributed in the many villages of the neighbourhood, as they had been round Jena. Gravert's Division was advanced to Orlamunde and found room there. Massenbach's report therefore seems to have artfully evoked a difficulty, which was to make the execution of supreme orders impossible and to draw the army over to the other bank of the Saale. Another disastrous result of Massenbach's presence at the Council at Erfurt.

It was not till 9-30 P. M. of the 9th October that the Duke wrote a distinct order to the Prince to concentrate on this side (that is, the left bank) of the Saale.

In the course of the afternoon General Count Tanentzien had been beaten, and retreated during the night till 4 o'clock towards Mittel-Pollnitz so as to gain shelter behind the Saxons supporting him. The report of this reached Head Quarters only on the 10th and had therefore no influence on the strategical decisions taken on the 9th October. Of these that which was destined for Count Tanentzien as to covering Saxony was now impracticable.

I cannot deem my reflections upon the 9th October complete without pointing out to you yet another circumstance which was disastrous for the Prussian army and is on this date clearly made manifest. Namely, the Prince zu Hohenlohe reckoned on being able to reach and occupy the Mittel-Pollnitz position with the Prussian and Saxon troops by different routes. As transpired later, Bernadotte had on the 10th reached Auma, Triptis and Neustadt, while Murat had pressed forward yet another day's march beyond this line. * * * Had then the Prince actually attempted to carry out the intended march from Jena, he would have been attacked by Bernadotte and Murat in flank. None of his orders mention the possibility of such a collision, and the Prince appears to have been in the belief that he could carry out this march in perfect security. This is a proof that in the Prussian army they were not aware of the great marching capability of the French troops When the first news of the appearance of French troops at Naumburg, which was expected for the 12th October, reached the Duke of Brunswick, he lent it no credence and said. "They cannot fly!" * * * *

The combat of Saalfeld is on account of the relations between its cause and its issue extremely instructive. In reflecting upon this action too we find proof of the fatal results that may accrue from a Council of War at which the subordinate leaders have been assembled.

It is a wide spread tradition that Prince Louis Ferdinand allowed himself to be led away by his ardour to fight an unfavourable action and became the sacrifice of his own imprudence. Hopfner's official account refutes this * * *

He had on the 9th October marched from Stadt Ilm to Rudolstadt, and had to occupy Saalfeld with the foremost troops of his advanced guard. He knew nothing more than that the main army would on the 10th march to Blankenhayn and the neighbourhood. Hohenlohe however who had received orders to take up a position between Cahla and Rudolstadt, had informed him of his intention to begin the passage of the Saale (as he thought, to be carried out by the whole army) on the 10th October and to concentrate near Pollnitz. In case of this manœuvre being effected, Prince Louis was to march upon Possneck and to form the advance guard of Hohenlohe's army on the right bank, just as he hitherto had formed it on the left. The Prince could not therefore suppose otherwise than that on the 10th October a general close to the left of the whole army would take place, in which the army of Hohenlohe would cross the Saale and the main army would *en masse* step into its place. This left close of Hohenlohe's army Prince Louis had to cover by a march from Rudolstadt and Saalfeld to Pössneck. The road to Pössneck leads by Saalfeld to the right bank in an easterly direction. There was therefore traced out for him a flank march in sight of the enemy to cover Hohenlohe's army, and this flank march compelled him to cross the river at Saalfeld.

Let us consider the distances. Prince Louis' main forces were at Rudolstadt—Blankenburg, two miles* from Orlamunde, where Gravert's Division, a part of Hohenlohe's army, which he had to cover, was bivouacking, two miles from Blankenhayn, whither the main army was to march that day, two and half miles from Pössneck, his marching objective, if Hohenlohe's army crossed the Saale. His outposts were at Saalfeld, from whence the direct road led to Pössneck only two miles distant. At Saalfeld he covered both armies, the main army and Hohenlohe's. Marching from Rudolstadt to Pössneck, he might easily get to the latter place too late, if he waited for the news of Hohenlohe's army having crossed the river; not so, if he went from Saalfeld, because marching from there he would be falling back in touch with the enemy, against whom he was to cover the army.

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* German miles are meant; one German = 4¼ English miles.

enemy's position. The first and second might be in line, the first line covering its advance if necessary by sending forward a section per company in extended order. The remaining lines in lines of small columns at deploying intervals. For it is certain the enemy's rifle fire would be all directed on the first or firing line, whose return fire and smoke would cover the small columns of the lines in rear from any aimed fire of the enemy. These small columns on coming up to the firing line, would be more likely to carry it on towards the enemy than a simple two deep line, and they would form compact bodies for the assault.

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These columns should of course not be deep ones, not more than four ranks deep.

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Such columns could quickly form line when necessary by deploying outwards, the two sections in rear coming up on the right and left of the two leading sections.

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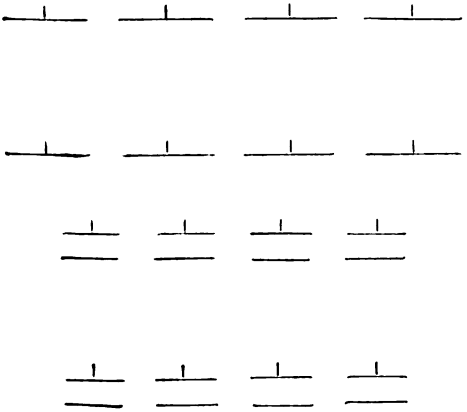

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Major Young in his Prize Essay considers that the difficulty of intermixture of units may be got over with our present small companies by strategic regards arbitrarily interfering with the tactical combat. Here Tactics were subservient to Strategy.

That the Prussian tactics afforded so weak and so short a resistance in this combat to the French, was not the Prince's fault. That lay outside his reckoning. For all the leaders in the Prussian army were still under the delusion that the line tactics of the 18th century would under the leadership of Prussian discipline be superior to the French skirmishing tactics.

When the Prince's report of his plans for the 10th October reached his superiors, they recognized the danger into which he was falling. But it was too late for a counter order to reach him.

Only at 7 o'clock in the evening had Prince zu Hohenlohe definitely abandoned his plan of carrying his Prussian troops on the 10th over to the right bank of the Saale, but he still wanted to leave the Saxons there and it was not until 9-30 P. M. that the Duke of Brunswick wrote a distinct request to the Prince to concentrate on the left bank. It was only after the news of the issue of the combat of Saalfeld that Hohenlohe decided to evacuate the right bank and bring over the Saxon troops as well to the left. It is not clear * * * whether Prince Louis was informed by the staff of Hohenlohe's army on the evening of the 9th that the idea of a passage of the Saale for the 10th October had fallen through. But the King wrote so to him. This letter however never reached the Prince. Consequently he remained to the end of opinion that he had to cover this flank march and to withdraw presently upon Pössneck.*

It is interesting and instructive to examine into the strategical causes that led to the catastrophe of Saalfeld, apart from the tactical mistake as to the capability of line tactics withstanding skirmishing tactics. We have recognized the foremost strategical cause to be the uncertainty in which the Prince was left to the last, and the double lines of retreat which he must have believed, he had to hold. The next question is, how it came to pass that the Prince was left in this uncertainty.

If the army of the Prince zu Hohenlohe had literally followed the orders issued on the 8th October at 1 o'clock noon at Erfurt, had concentrated on the 9th at Hochdorf (not far from Blankenhayn) and on the 10th had occupied the Saale between Cahla and Rudolstadt, it could never have come into Prince Louis' mind at all to march to Saalfeld and there to try to hold the pass over the Saale. At the utmost he would have sent to Saalfeld, to empty the magazine there and remove it to Rudolstadt. In direct and close communication with the rest of the army and assigned only to the left bank of the Saale, he would at the approach of superior forces of the enemy have quickly withdrawn to Schwarza and then to Rudolstadt, if he had made a forward move with his main body out from Rudolstadt at all.

Is the Prince zu Hohenlohe to be condemned for not literally obeying the order? We have seen that he was half authorized to conclude that the movement upon Hochdorf upon the Saale was only to lead to the passage of the river. In answer to his report drawn up on these lines the Duke wrote almost in approval and further added, as above noticed,

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* Prince Louis Ferdinand was killed in this action.

It is impossible to expect men to remember to adjust their sights for varying distances in the heat of a close fight. Neither then should they be required to do so on the rifle range in peace practice. They would then become skilled in using the fixed backsight for the short ranges.

The question of large companies or small companies has been much discussed. It is owned that the battalion is now too large a tactical unit—but is not our company too small a one?

A company of 100 to 120 files of four sections seems the best tactical unit. It is like a small and handy battalion. At present our battalions have no formation that they can readily adopt from which line can be quickly formed.

The line is usually deployed from a battalion column, which takes a long time, or it may be from columns of half battalions which is quicker, but not so quick and convenient as from a line of company columns at deploying intervals—the companies being large—four to a battalion.

Supports from Cahla and Jena could not possibly have reached the advance guard fighting at Saalfeld in time.

On the morning of the 10th October the allied army was on the whole distributed as follows :—

(1.)—Hohenlohe's corps.
  Tanentzien and the Saxons at Pollnitz.
  Two small detachments at Neustadt and Pössneck.
  Prince Louis' advance guard in èchelon from Rudolstadt past Blankenburg to Saalfeld.
  Gravert's Division at Orlamunde,
  The Reserve under General Sanitz at Lobeda and Jena.
(2.)—The main army stood in close cantonment round Erfurt with the advance guard under the Duke of Weimar between Schmalkalden and Meiningen.
(3.)—Ruchel between Eisenach and Gotha.
(4.)—Blucher between Creutzburg and Eisenach, a detachment at Vach.

The army had still therefore an extended front of 18 miles.

In the course of the 10th October the main army left this position in accordance with the orders of the 8th October for Blankenhayn-Hochdorf and the neighbourhood, with the exception of the reserves which were directed to Weimar. Ruchel reached Erfurt with his advanced troops, Blucher's troops the country between Eisenach and Gotha.

Upon the news of the combat at Saalfeld the troops of Prince Hohenlohe's army were directed to concentrate at Jena on the left bank of the Saale. The orders to this effect could only reach them late in the afternoon. Most of the troops had to make a night march (10th—11th October.) This fatigued the Saxons excessively, for they had been standing under arms the whole day at Pöllnitz waiting for the enemy, and even more so Tanentzien's men who after two days' fighting were now making a second night march. The worst was that the commissariat failed—Massenbach, feeling certain that the army would advance on the right bank, had directed the commissariat train to Gera. It could not reach the troops and in its flank march was even in danger of falling into the hands of the enemy. Ever since the 9th October the troops had suffered want, for the bread they carried with them was too quickly baked and grew mouldy.

Nothing endangers supplies for the troops more than irresolution in the strategical dispositions, counter marching and counter-orders. For commissariat trains are unwieldy and by reason of the distance at which they have to be left in rear, cannot receive directions at any moment. Nothing weakens troops and dispirits them so much as hunger. I have seen beaten troops regain their whole confidence with an encouraging word from an officer. But they were well fed. The *moral* of men faint with hunger cannot be permanently quickened by spiritual means alone but by bread alone. Old Radetzky once said to me :—"A full stomach makes a good soldier."

Hopfner finds great fault with the march of the main army on Blankenhayn—Hochdorf as being objectless, and inclines more to Scharnhorst's suggestion of marching off to the left and waiting for the enemy further back between the Saale and the Elster. I cannot altogether agree with this view, for if they marched off to the left now, they must have given up all idea of joining with Ruchel's and Blucher's troops. They were moreover too weak and must have concentrated first, before they could think of a general engagement. The concentration of the main army round Blankenhayn and of the Prince zu Hohenlohe's army round Jena drew the forces at hand closer together so that they were able to act together and strengthened by this union of forces, wait for Ruchel's and Blucher's troops.

Such a concentration of all available fighting men could of course have had the one object of acting in common and not separating again without good reason. The opportunity would then have presented itself of falling upon Lannes on the 11th with the main army or upon Angereau on the 12th in conjunction with Hohenlohe's army and of driving the latter corps into the Saale. The weaker can only conquer by overpowering one part after another of the stronger's force with combined strength. The opportunity for this must be watched for and grasped. It would, as events proved, have offered itself. It was moreover according to the King's letter to Ruchel intended to concentrate to the left and attack the enemy's left flank, if he turned the left wing on this side of the river.

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It is of the greatest interest to enquire why at the Grand Head Quarters on the evening of the 10th October there was no mention of this plan.

The actual Commander-in-Chief, the Duke of Brunswick, had, as I have said, hoped until the 8th October that the war might yet possibly be averted, because he held a successful issue impossible, That the war did break out, made the otherwise so trusty general wayward ; he despaired of the result, and he who has no confidence, is robbed of initiative and is therefore half beaten. Then came the news of the unlucky combat of Saalfeld. In itself this advance guard action with a loss of 2000 men was of secondary importance. An advance guard which is repulsed, must always suffer some loss. The general situation was not compromised by this action, the position of the army not altered for the worse. But that the first collision was not attended with victory seems to have made a deep impression and it appears as if the death of the Prussian Prince, upon whose talent and warlike humour such great hopes were set, produced a kind of panic in the Grand Head Quarters. It is a strange matter when such a depression of spirits attacks a head quarters. Terrible news is brought in. Every one who feels it, is infected by the long depressed faces of those who already know it, and all give themselves up to apprehensions without being able to arrive at any decision as to what to do. The best time for action is thus lost. Great minds with much experience of war, can, if they are at the head of an army, overcome this feeling of terror with a single word, a single movement. Napoleon at Castiglione tore the badges off the shoulders of the general who in a state of excitement brought a message of ill news * * * Sometimes a jest breaks into the panic and restores tranquillity.

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This however was not the case at Head Quarters at Blankenhayn on the 10th October. * * * The most varied counsels were listened to, approved and rejected again, whilst the troops had to wait all night under arms, and finally the retreat to Weimar was ordered and begun early in the morning of the 11th October. * * * In consequence the troops without seeing an enemy but also without food were in motion for more than 36 hours and at last got back to the place they started from.

We learn from this that irresolution in the leaders absorbs the strength of the men and can in a short time make a whole army unfit to fight. For that was what the greater part of the allied army was on the morning of the 11th October after the night marches. We learn from this that it is better in war to do anything with decision than to hesitate. Order, counter-order, disorder—the Best is the enemy of the Good. What one has recognized as good, one must hold fast in war and not let oneself be led away in search after what is best. Another lesson for us is that in Strategy resolutions must be taken coolly and without concern, without rousing passion, be it anger, hate, alarm, temerity or fear.

In conclusion we learn that it is of the last importance to gain a success in the first engagement with the enemy, and so to manœuvre in such a way as to have the superiority in the first little action. For the news of a first success strengthens the confidence of the leaders in their men and vice versa, and electrifies the troops who have not had a share in the fight, so that they grow eager to reap laurels too, whereas the news that the first engagement has been unsuccessful, produces the very opposite effect. You know how quickly in every day life reports spread and grow. How much more quickly then in war, in an army, where men are so closely collected together.

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On the 11th October the main army encamped at Weimar, fronting towards Saalfeld, so that the main forces of the enemy were already marching past the left wing. The troops of Ruchel and Blucher (the latter partly after a march of six miles which lasted well into the 12th October) reached cantonments not far from Weimar. The army of Hohenlohe was to pitch its camp on the plateau of Jena near the main army.

But the latter's movements were disturbed by events, which prove how quickly the discipline of the best troops relaxes, when they are demoralized by want of food, useless marches and counter-marches, and palpable uncertainty on the part of their chiefs. In Jena itself a false alarm arose, waggons in flight missed the way and blocked the roads, the troops could not reach their camping grounds, spent the night in column of march and diverted themselves by plundering one another or the houses, for again they had had no provisions. The commissariat train coming up from Gera caught the alarm, turned far aside to the north and again on this day did not reach the army.

In the main army also a bad spirit began to stir and made itself actively noticeable.

Strategical measures often demand that troops should suffer privations. Just at the time when forced marches have to be required of them, it turns out that here and there provisions fail. Troops can bear this for a time, if not quite such starvation as the case was at Jena, and if they only feel that orders are explicit and their leaders know what to do. The hardships which our troops had to go through before the battles of St. Privat and Sedan were simply colossal. For instance, towards the end of August 1870 the men of the infantry fell down in crowds, when it became a question of heading MacMahon's flank march. But the confidence which was stamped on the face of every command, imparted itself to the troops. Useless counter orders were not issued, and so no mistrust of the Generals was felt. The hardest task was cheerfully performed. When we left the route westwards, and on the 17th August took the direction to the north, I heard the men laugh and say :—"To-day it's 'army corps' right wheel"! And on the 25th August when again we bent northwards, they cried "Armies, right wheel"! The faith of the army in eventual success was like that of a believing Christian in a divine Providence. Yet thousands and thousands lay on the roadside, cheerfully those whose strength did not desert them, helped the others. * * *

The exertions of Napoleon's troops in the October days of 1806 were not less than those of the Prussians. But when the marches are first hither, then thither, instead of fresh and merrily forwards,—when orders just given are cancelled again by changes, when consequently they prove not properly prepared and not sufficiently in harmony with the directions for the commissariat, despondency and distrust are added to labours and privations, discipline relaxes, the labour is increased and destroys in steady progression the moral bearing of the army. The worst was that the Commander-in-Chief himself seems to have been most infected by this humour. He let anything happen and submitted to it. This is the most unfavourable mood for a Commander-in-Chief, for it paralyzes initiative.

I have been informed by Austrian officers that at the time after the battle of Königgratz, Benedek sometimes went to Olmutz amongst the young officers and soldiers and spoke with a soldier's humour encouraging and jesting words to them. They could not think how he could keep his good humour after such a disaster. I must confess that I think most highly of him for this. The unsuccessful general proved thereby that he at any rate possessed the strength of character which the leader of an army should possess.

The whole of the 12th October was spent by the Prince zu Hohenlohe's army in restoring order to the masses who had fallen into confusion through the panic of the 11th, and then in marking out and pitching the camp which was allotted to them, with the right wing at Kapellendorf and the left on the Schnecke near Jena. On this day the difference between the mobility of Napoleon's system and the clumsiness of the proceedings which had grown into a matter of course in the Prussian army through the customs of the past century, came vividly to light. Napoleon's troops this day gained 4 and 6 miles respectively of ground to the front, and yet found time to get quarters or encamp.

The Prussian troops employed the whole day in pitching a camp,—a proceeding always attended with much ado,—and there was among them not a single man who thought of falling upon and destroying with the masses at hand on the spot the comparatively weak forces, which were boldly pressing forward on the left bank of the Saale, and even compelled the Prussian outposts to retreat at the sight of the army marching up not quite a mile away! Quite the contrary! Every shot from a hostile skirmisher, every glimpse of the enemy's patrols carried consternation and anxiety into the Prussian ranks. The want of provisions made itself even more felt.

The main army remained on the 12th October in camp. Ruchel's and Blucher's troops could this day make no further move, for the march of the 11th had in some cases lasted well into the 12th. They waited for news of the enemy before adopting any resolution.

Consequently they yielded up all the fruits of the political initiative which they expected to have been able to gather in the domain of Strategy, voluntarily allowed the law to be laid down for them by their opponent, of whom—according to our modern experiences—through wrong employment of the cavalry they were almost wholly without information.

On the evening of the 12th the vaguely heard rumour was at last confirmed by trustworthy reports that the enemy had entered Naumberg. No longer now was it possible to remain inactive, if they did not wish to be surrounded by the enemy, for Naumburg lies to the N. E of. Weimar, nearly due North of Jena. The resolution they took was a correct one. General Werder* would certainly in such a case have attacked at Jena on the 13th, as he did at Villersexel, had he had Bourbaki opposite him here with his unwieldy masses of new formation and Gardes Mobiles. But Napoleon was no Bourbaki, and his army consisted not of Gardes Mobiles but of the best trained, most experienced and best organised troops in the world then. So Strategical resolutions are not dependent on numbers alone and distances, but also on the characters of the hostile troops and their leader.

An offensive in the direction of the Landgrafenberg might have brought the whole army of the enemy to a stand at Jena on the 13th, as Werder's offensive did at Villersexel. We have already related how the mere glimpse of the Prince zu Hohenlohe's troops on the 13th October induced Napoleon to concentrate his army in this direction, because he took these troops for the combined forces of the Allies.

In view however of Napoleon's great superiority of strength an offensive in the direction of Jena and thereabouts on the 13th, if undertaken with the whole forces, could only hold out the prospect of a momentary success. A crushing counterstroke was then probable, as soon as Napoleon brought up his reserve and the wings surrounded the Prussian army. It was therefore better to act as they did.

The main army was directed upon Kosen to close the pass there and to commence the retreat over the Unstrut. The Prince zu Hohenlohe's army had to form the rear guard at Jena on the Saale: Ruchel to advance to Weimar.

The way in which business was done at the Grand Head Quarters, prevented the execution in time of a quickly formed plan, which demanded immediate action, if it was to have useful results.

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* Commander of the 14th German Army Corps and hero of the operations on the Lisaine in January 1871.—Translator.

About mid-day the Duke wrote the letter in which he said, it was not at all his purpose to await the enemy on this side of the Saale. I have already observed that the Prince saw and might well see in this a corroboration of this idea that a passage over the Saale was first of all in view. The Duke to be sure went on to say, that he left it to the Prince to draw the Saxons to himself and wait for the main army, before he began his movement over the river. But the Saxon troops already stood on the further side. It was natural to consider their marching backwards and forwards useless Meantime there came in General von Tanentzien's favourable report on the first part of the action of Schleiz. On this account the Prince, as far as the Prussian troops were concerned, abandoned the passage of the Saale and disposed the Saxons as a somewhat necessary support to Tanentzien. For, even if this General up to the time of his report was still victorious, it was yet probable that the advancing enemy would reinforce himself and that Tanentzien would stand in need of support by fresh troops.

In the meantime Massenbach had reported that between Cahla and Rudolstadt no point of rendezvous for the army was to be found. According to our modern ideas it is incomprehensible how such a report could be believed in. But even according to the ideas then held on campaigning, by which great wide open plains were required for a camp, the report is surprising, for the gist of the order was not to pitch a general camp there, but only to occupy the ground with the troops. These might have been distributed in the many villages of the neighbourhood, as they had been round Jena. Gravert's Division was advanced to Orlamunde and found room there. Massenbach's report therefore seems to have artfully evoked a difficulty, which was to make the execution of supreme orders impossible and to draw the army over to the other bank of the Saale. Another disastrous result of Massenbach's presence at the Council at Erfurt.

It was not till 9-30 P. M. of the 9th October that the Duke wrote a distinct order to the Prince to concentrate on this side (that is, the left bank) of the Saale.

In the course of the afternoon General Count Tanentzien had been beaten, and retreated during the night till 4 o'clock towards Mittel-Pollnitz so as to gain shelter behind the Saxons supporting him. The report of this reached Head Quarters only on the 10th and had therefore no influence on the strategical decisions taken on the 9th October. Of these that which was destined for Count Tanentzien as to covering Saxony was now impracticable.

I cannot deem my reflections upon the 9th October complete without pointing out to you yet another circumstance which was disastrous for the Prussian army and is on this date clearly made manifest. Namely, the Prince zu Hohenlohe reckoned on being able to reach and occupy the Mittel-Pollnitz position with the Prussian and Saxon troops by different routes. As transpired later, Bernadotte had on the 10th reached Auma, Triptis and Neustadt, while Murat had pressed forward yet another day's march beyond this line. * * * Had then the Prince actually attempted to carry out the intended march from Jena, he would have been attacked by Bernadotte and Murat in flank. None of his been given, and thus make their execution easy,—what I might call "initiative in obedience." Once in the War Game I saw a very instructive example bearing upon this. A body of troops was marching from A. upon an enemy who was at B. There was a detachment at C. also marching independently upon B. past a village D., which lay on the route. When this detachment had passed D., it received an order despatched early that morning to march towards D. The detachment turned about and marched back to D. Thus it followed the letter of the order and acted against its spirit, which could only have meant, to march upon the enemy in the direction C—D.

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From the events of the 13th October it is further evident how much better it is to give commanders of armies and corps "directives" in writing regarding their orders, than to summon them or their chiefs of the staff to interviews, quite apart from the fact that they are thus robbed of much time. Had the Duke of Brunswick at 4.30 P. M. on the 13th written somewhat as follows to the prince zu Hohenlohe:

"The enemy has occupied Naumburg. The main army decamps at once to take the pass of Kosen. The army of the Prince zu Hohenlohe has to cover this march of the main army in the course of the 13th October by preventing the enemy from advancing over the Saale, especially at Jena and Dornburg. On the 14th October the main army will continue the retreat over the Unstrut and the army of the Prince zu Hohenlohe will follow it as rear guard to Auerstadt and Kosen."

The Duke would have needed no more time for this letter than for that in which he required Massenbach's presence at Head Quarters. The Prince and Massenbach would not have taken it into their heads that they were forbidden to repel an enemy crossing the Saale to attack them. On the contrary as an experienced general the Prince knew well that one cannot remain for ever rigidly on the defensive, and he would have perceived that it lay strictly within the limits of a defensive attitude to drive Lannes on the 13th into the Saale. As an experienced General too he would have recognized that the army could scarcely retreat without fighting, after Lannes had once reached the Landgrafenberg through Jena. He even expressed the hope that Lannes was commanding against him, as he would be sure to "take the bait." But he would never have dreamt even then of planning extensive offensive operations beyond the Saale.

Let us think out the consequences that would probably have ensued, had the Prince zu Hohenlohe not been stopped at noon on the 13th from carrying out the attack he had begun. He would probably have thoroughly beaten Lannes and hurled his corps down into the Saale. It is not impossible that the same fate would have befallen Angereau coming up afterwards from Rudolstadt unless he had remained at Cahla. Napoleon would not have been able to do any good on the 13th, for he arrived at the Landgrafenberg only at 4 o'clock and then only by himself. By that time all would have been over. The army corps that were coming up would have found the defiles of the Saale blocked up with the backward flood of Lannes' masses. It is very much the question whether Napoleon would then on the 13th have still directed Davout's and Bernadotte's Corps' upon Apolda, or not have preferred to unite his army on the 14th on the right bank of the Saale, to wait for the attack of the army of the Prince zu Hohenlohe, which he took to be the united Prussian forces, and allow him to begin.

A fight on the 13th October would of course not have been a decisive battle, for it would have affected only a small portion of the French army. But it would still have been a success which might have raised the confidence of the troops and counteracted the mishap at Saalfeld. This success might perhaps have had as great an effect as the battle of Gross Gorschen* had, might have checked Napoleon in his advance, have compelled him to proceed with greater prudence and more slowly, and have gained the Prussian army time to unite and withdraw all together to a position, the line of retreat from which was not threatened. For this purpose it would certainly have been necessary that the main army should hold the pass of Kosen on the 13th and on the 14th have continued the retreat over the Unstrut. On the same day the Prince zu Hohenlohe in conjunction with Ruchel could have followed the retreat as rear-guard, whilst a great mass of cavalry veiled the retreat of this rear guard on the plateau of Vierzehn Heiligen. * * * Then Napoleon on the 14th when he had learnt the retreat of Hohenlohe's corps, would have been obliged to first defile over the Saale in order to pursue, and would probably have scarcely been able to overtake him that day.

Had Napoleon ventured then, in spite of a repulse to Lannes, to prescribe for Marshals Davout and Bernadotte a march on Apolda for the 14th October, the main army would have had an opportunity of beating such portions of these corps as had crossed the river on the 14th October, (just as Hohenlohe's army might have beaten Marshal Lannes on the 13th,) unless the defiles of Camburg and Kosen were already closed on the 13th by the main army of the Prussians. It had had plenty of time to do this, inasmuch as it began its march early on the 13th, and the distance from Weimar to Kosen amounts to hardly 4 miles.

Instead of all this there ensued on the 14th October the double catastrophe of the Prussian army.

That the army of the Prince zu Hohenlohe was worsted on the 14th can, as I have said, not be a matter of surprise considering the overwhelming numerical preponderance of the French and the superiority of their organization and tactics.

At Auerstadt the main army met the head of Mashal Davout's columns, as they debouched, at the right moment for driving them back into the defile of Kosen, for the superiority of the main army was here overwhelming especially at the commencement of the fight. The Duke of Brunswick was even on the point of profiting by the advantage of this position, when the deadly bullet struck him. This put a complete stop to the unity of the supreme command in the Prussian army and the battle was given up as lost, without the whole of the forces having been engaged.

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* A village about 12 English miles S. W. of Leipzig, where a fierce but indecisive engagement was fought on the 2nd May 1813 by the allied Russians and Prussians against the French.

We learn from this that in war in addition to all possible strategical wisdom one needs yet another element without which one cannot conquer, and that is luck, as I have said before.

Frederick the Great used often to say :—" The man has no luck, I cannot employ him."

LETTER 5.

SUMMARY.

Let us cast a glance back upon the occurrences which led to the catastrophe of the 14th October and summarize the strategical lessons which we can deduce therefrom.

The superiority of the French army to the Prussian in numbers, tactics, and organization was certainly of such a kind that we who are further fully informed on all points on both sides, must say, that the Prussian Saxon army had from the beginning but small prospects of eventual success. But it was not absolutely necessary that such a complete disintegration of the army should take place. It lay still in the condition that on the part of the Prussian army a few lucky combats might be fought and an orderly retreat before superior forces might be commenced with the view of turning the tables in coalition with the expected assistance from Russia. To the sum total of the result the following strategical factors materially contributed.

(1.)—Policy on the Prussian side did not go hand in hand with Strategy. The policy adopted since the 9th August was war. The mobilization of all the troops did not follow forthwith, and they were not set in motion as soon and as fast as might have been. They hesitated and lost time,—so much time that the start of six weeks gained by Policy (for it was not till towards the middle of September that Napoleon came to the conviction that Prussia was willing to risk a war) was lost again.

Before the war had actually broken out, the lead gained by Policy had already been yielded to the enemy ; they felt themselves relegated to the defensive ; they voluntarily took the law from their opponent.

On the French side on the contrary we see Policy and Strategy proceed from one and the same mighty source and blend harmoniously together. Napoleon certainly deceived himself at first as to the intentions of his antagonist. As soon however as he had perceived, that it must come to war, he lost not a day further than was needful for the concentration, for the strategical advance of the army and for preparations, but with the most lively protestations of his love of peace began the strife of annihilation. He gave, you will say, two extra days of rest to his army to prepare itself for hardship,—which army had already been lying quiet for more than six months in quarters in Bavaria. Very well, but the army took ten days on the march to the point of concentration, and it was after these ten days that he allowed two days' halt. Moreover I am inclined to think that he would not have allowed even these two rest days, had he not wished to wait for the Guard coming from Paris, in order to be assured of his superiority.

(2.)—On the Prussian side the army was so disposed as to cover the whole frontier from the sea by Paderborn, Eisenach. and the Thuringer Wald to the Austrian frontier. Against it Napoleon marched in close masses, at first certainly in the direction of Dresden and Berlin, but this only because he knew not for certain where the enemy's main forces were to be found, and with the declared intention of throwing himself upon them, so soon as he should meet them. When he believed that they stood before him, he gave the orders, according to the position of affairs, which alone could unite his forces for the general end in view.

(3.)—On the Prussian side there was no attempt to combine the whole forces for a decisive battle: 10,000 to 20,000 men were detached on minor missions which could have been fulfilled by a few cavalry patrols.

They did not mobilize the whole of the troops, had left some behind in the eastern provinces, and what I have not yet brought to your notice—had left a whole corps under the Duke of Wurttemberg as a strategical Reserve. The idea of a strategical Reserve to be kept in hand, in order not to stake all on one battle and in case of defeat to have still a nucleus intact on which the fragments of the beaten troops are to rally, reorganize and prepare for fresh exertions, is a very natural and at first sight obvious idea. * * * It is a mistaken one. If reinforced by the troops reserved for this purpose one cannot overcome the enemy, then without them one is all the more sure to be defeated. Afterwards, this small fraction of the army by itself cannot turn fortune, and must be beaten, when it finds itself opposite the combined forces of the enemy, as the Duke was at Halle.

The French Emperor combined all the fighting men that he could bring to the ground into one single force. He marched in such formation that if the corps moving in front had been obliged to give way, he could have united the whole army for a decisive stroke towards his centre in one day, towards his front in two days. He neglected all other considerations and allowed himself to be not in the least disturbed, because Prussian scouting parties surprised his line of communication. He knew too well that if only he won in the main battle, all the small hostile lateral detachments must give way, like chaff before the wind.

(4.)—We see the Prussian Generals entangled in the old fashioned strategical principles and systems of the past century ; in part they are tied down by the old customs of campaigning which take up a great deal of time and fetter the movements of the army—old customs of which Napoleon had shaken himself free.

He recognized no system and no strategical principle but that alone, to do what leads to victory. He had not even a plan of operation. *Je n'ai jamais en un plan d'operation,* he is said to have declared. He marched straight at his enemy and led his troops in such a manner that he could at any time at the proper moment reach the enemy with the whole of them wherever he might meet him.

(5.)—The Prussian Generals several times and even on critical occasions altered their plans without any necessity thereto on the part of either the enemy or events, but solely because another idea found favour. For instance, on the night of the 10th-11th October at Blankenhayn, and with Hohenlohe's corps on the 11th October and on the 13th October.

Consequently they allowed the opportunity for fighting with success to escape them, caused fatiguing marches and countermarches, crossing and confusion without a step of ground gained, and lost the time for action.

Napoleon remained resolutely in constant activity. By means of dispositions carried out consistently and in conformity with each other and the object in view, he stimulated his army with a fresh and eager spirit. Even he committed mistakes against the newly formed principles of strategy—mistakes for which he would certainly afterwards have inwardly blamed himself, but which did not come to be spoken about, because the enemy took no advantage of them. We * * * reckon these to have been—the exposed march of the left column on the left bank of the Saale, the dispositions made without knowledge of the enemy, the dangerous advance between the hostile army and the neutral state, and the abandonment of the line of retreat. But in consistent carrying out of his idea he proceeded with uninterrupted activity. This activity and rapidity of his breathed a sense of security which took the enemy's breath away, forbade the enemy a thought of a mistake on Napoleon's part, and reduced him to such a state of inactivity that he derived no advantage from Napoleon's errors. The Emperor preferred the Good and thus lost no time in search after the Best.

Thus we see that on the Prussian side all the five axioms were violated, which I laid down in my first letter to you as the basis of a sound strategy, while Napoleon on the other hand adhered to them.

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We learn from the occurrences of the 8th to the 14th October, 1806, something further, to which I cannot refrain from again adverting.

In spite of the superiority of the French in numbers, tactics and experience in war the Prussian army was offered the opportunity on the 11th and 13th respectively of gaining very considerable successes. They would probably not have immediately led to general victory. But they could, as I before observed, have brought the enemy to a stand still in his operations in a very uncomfortable position. They could have supplied the Prussian army with time for an orderly retreat. In this retreat the army could have joined the reserve army of the Duke of Wurttemberg and placed itself in a position demanding respect. Who can say that what occurred in 1813, could not then have taken place, namely the postponement of the final decision and a favourable turn of luck with the timely arrival of help from Russia and a reversal of the policy of Austria? Hence it follows that the stronger is in war not always assured of success.

Blume points out five strategical questions which a state must put to itself and answer before taking steps towards war. To these five questions as to (1) the resources at the enemy's disposal, (2) his strength of will, (3) his opinion of our strength of will and resources, (4) what he has at stake in case of war, (5) the resources at our own disposal, I should like to add a sixth. Namely, the question as to the speed with which both sides can bring their resources to the decisive point.

But the replies to all these questions to be coolly put to Strategy give only a result of probability, never of certainty. The unforeseen incidents in war often put the opportunity of victory into the hands of the weaker. Such is the lesson taught us by the days of the 11th to the

13th October 1806. Such is the lesson of the war of 1796, when the answer to all these questions could only have been given unfavourably for the French troops perishing in the Maritime Alps ; yet Bonaparte conquered. Such is the lesson of the campaign of 1814 in which Napoleon had almost driven the allies to retreat over the Rhine in spite of their overwhelming superiority, and in which he could have negotiated a peace very favourable for himself, if he had been a little less pretentious at the conference of Chatillon. Such in conclusion is the lesson taught by our last wars. Or have you forgotten how before the war of 1866 all the so called voices of "common sense" were raised against this war, because by reason of the superior numbers of the enemy, it was without a prospect of success? And do you remember the opinion which so many held in 1870 that we should lose the first battles against the veteran French arms? * *

The lesson I draw from this is that even if the answer to all these six questions proves unfavourable to us, nevertheless we need not despair. There is always one more chance of victory. The decision to make war cannot therefore depend alone on the reply to six sober questions. There is something else besides cold strategical calculations that is needed to drive peoples and states to so stern, pregnant and weighty a resolution as that is—war with all its sufferings, sacrifices, and horrors. And if honour and the other most sacred possessions of the Fatherland demand that we should take arms, then those sober strategical considerations rank only second. Then strategy must consider itself above all other considerations dependent on and subservient to Policy. The dependence of Policy on Strategy must cease. * * * Thus was it in 1806. In such a case one must hope for those "unforeseen incidents," trust in one's right, and to luck, as it is generally called, or as I prefer to call it, to that Higher Hand which sways the destinies of men. * * *

THE TRANS-CASPIAN RAILWAY; ITS MEANING AND ITS FUTURE,*

TRANSLATED AND CONDENSED FROM THE RUSSIAN OF I. Y. VATSLIK,

BY

LIEUTENANT-COLONEL W. E. GOWAN, *Bengal Infantry.*

NOTE.—Under the head of the Central Asian Railway, the following has appeared in the Russian Official Messenger, in reply to certain criticisms in the Russian newspapers as to the cost of construction and the material efficiency of the Central Asian Railway;—" The St. Petersburg Gazette inserted in its issue, No 165, an article upon Mr. Vatslik's brochure entitled *The Trans-Caspian Railway; its meaning and its future*. This article contained a large number of incorrect details† concerning the construction and the development of the line in question. For instance, it states that the line cost 60,000,000 *roubles*, whereas, at the most, the sum did not exceed 40,000,000 *roubles*. It also affirms that to keep the road in a good state of repair five workmen *per verst* will be required, and that they will be worked without intermission, while in reality, there will be needed very few more than one workman *per verst* for this task. The assertion also that all the bridges on the line are made of wood is quite incorrect. As a matter of fact there exist a large number of wooden bridges on stone supports across water channels, but none of these have a greater width than 13½ feet. All the other bridges (of which there are 56) two of which exceed 270 feet in length, either are, or soon will be, made of iron, for which the necessary materials are now being deposited at the different spots. Finally, the writer of the article goes almost as far as to deny the existence even of the line, which, as every one knows, has worked, is working now, and will continue to work, despite certain unfavourable local conditions, such as the vast sandy tracts which were formerly considered quite impracticable for the construction of a railway. These sandy wastes were represented as an insurmountable obstacle to any regular attempt at exploitation, but, notwithstanding all these doubts and fears, the line now traverses those very sands, and, during the last three years, has furnished a regular service of communication. In face of these facts, it is strange to find attempts made to diminish the importance of the Trans-Caspian Railway, of which, by the admission even of our enemies, Russia has the right to feel proud.‡

" He, who shall but aid in the attainment of the slightest sincere agreement between Russia and England in Asian affairs, will render a service to the whole human race and especially to the interests of the civilisation and prosperity of the inhabitants of both empires."

LORD MAYO.

PART I.

THE LINE AS A LINK ONLY IN A GREAT RAILWAY SYSTEM.

In Russian chronicles there has now appeared a fresh and a glorious page, for Russia has fairly started on her deeply conceived and energetically carried out plan, (a plan that she is, indeed, carrying out with an energy quite unexampled) in that she is now engaged in her sacred mission of diffusing the light of civilisation throughout the hitherto unknown countries of Central Asia.

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* St. Petersburg 1888, 61 pp 8 vo.

Passed by the official Censor on the 30th April (12th May) 1888.

† The author has since published a slip correcting the errors pointed out by the official Organ of the Russian Government —*Translator.*

‡ The above *communiqué* was translated and appeared in the *Times.*

W. E. G.

Setting aside the question as to how far political and commercial conditions and the situation, which is assumed by mere temporary needs, may have combined to aid in the attainment of such results (as have been already achieved,) we will confine ourselves to merely pointing out this fact, *viz.*—that these results have been arrived at during the glorious reign of the Emperor Alexander III, and that they may be termed the latest conquest, which has cost not a single drop of blood, and a conquest over which the entire civilised world, without distinction of nationality, may rejoice and sing peans of praise.

Let us, however, look more closely at the great work which has been accomplished.

We know from history that all trade relations with India, have derived thereby colossal profits and advantages.

LET US BEGIN WITH ALEXANDRIA.

Alexander the Great, who had destroyed the city of Tyre which before then had been a flourishing port on the western littoral of Asia, founded the city of Alexandria in the delta of the Nile, and this place subsequently flourished and became the richest amongst the towns of Africa only because of its importance as lying on the direct route of trade relations with India. For the same reason Alexandria became the centre of all the culture of the ancient world.

Prior to the opening of a sea route to India viâ the Cape of Good Hope, Venice and Genoa were the richest cities of their own day for the sole reason that they also carried on trade relations with India.

The discovery of a trade route to India had long been the handed-down day-dream of all peoples, and when at length, such a route was discovered and its direction had been more or less exactly defined, the development and enrichment of that Sovereignty which succeeded in possessing itself of that route was the natural and indissoluble result of such connections.

It was in searching for a sea route to India that Columbus discovered America, and the Portuguese Vasco-Di-Gama came upon the southern passage round the Cape of Good Hope. These discoveries were the beginning of a new era in which every country took a part in trade relations with India. Naturally and in consequence of the vast area of her East Indian possessions and of her large mercantile marine, the export and import trade of Great Britain took the first place in the new trading operations and thereby placed the United Kingdom in the position of the richest Empire of the world.

It indisputably was an event of universal importance when ships began to sail from Falmouth past the island of St Helena and round the Cape of Good Hope to Bombay, a distance of about 10,400 nautical miles and when they turned the southern littoral of Africa and passed through the Pacific Ocean to Calcutta or to Ceylon.

The English King Edward VI. too was not a little rejoiced when the English navigators, Willoughby and Chancellor in their search for a northern passage to India and China, almost by accident opened out

It is characteristic that the fondness for deliberation again comes to the fore. Ruchel and Massenbach were ordered to Weimar "in order to be informed of what was required to be done," instead of short distinct orders being sent to them, and the Generals of the main army were summoned to meet. * * * Eight priceless hours were thus lost. The summons to Massenbach was however yet to be especially fatal.

Hence we see how powerfully the quick precise transaction of business influences Strategy. The mechanism of the General Staff is an essential momentum of Strategy. * * *

On the 13th October unforeseen accidents played the cards into the hands of the Prussian army. Lannes in spite of the Emperor's warnings pressed rashly over the Saale at Jena in the face of the army there in camp ready for action. Tanentzien gave way with his advanced troops to Lannes, who now occupied the Landgrafenberg.

The Prince zu Hohenlohe set his army in motion to hurl the enemy down from the Landgrafenberg into the Saale and destroy all who had crossed the river. The attacking army advanced joyfully, for with a fourfold superiority the issue was not doubtful. It was just past 12 o'clock noon. At this critical moment Colonel von Massenbach appeared before the Prince and conveyed to him the most distinct orders from Head Quarters not to attack that day.

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It seems to me more than probable that Massenbach on the morning of the 13th at Weimar (whither he was summoned by a letter dated 4-30 A. M.) may again have vigorously urged his pet idea of a passage over the Saale and have opposed the resolution to withdraw over the Ilm and Unstrut. He probably received the clearest orders that the army of the Prince zu Hohenlohe was to hold itself only on the defensive on the Saale to cover the flank march of the main army from Weimar to Auerstadt and to close the passes of Jena and Dornburg, because an offensive on the 13th was not intended. With these distinct commands Massenbach now returned to the Prince and found his whole army about to make an attack. He did not at this juncture perceive that this offensive move was really an act on the defensive for the purpose of closing the defile of Jena to the enemy, and full of the order which had been very impressively delivered to him, he strictly adhered to its very letter.

It was a peculiar fate that the Price zu Hohenlohe and Massenbach, who had hitherto made the widest use of the independence incumbent on an army commander in drawing up his plans according to circumstances, followed the orders received literally at the very moment when it might have been plain that the sense and not the wording ought to have been kept in view. Hopfner describes the Prince's anger, but he finally obeyed and did not attack. Lannes took up his position on the Landgrafenberg and in the adjacent hamlets, and Napoleon was enabled that evening and during the night to collect the chief part of his army on that spot for the attack of the 14th October.

The lesson we get from this is that the commander of an army may take the orders he receives only in the sense in which they are given. Every detached body of troops indeed, however small it is, must carry out its orders with reflection as to the intention with which they may have distinguished themselves by opening out the countries of Central Asia. Fredchenko, A. Golubieff, Grigorieff, Vlangali, Vennkoff, Saivestseff, Protsenko, Baron Frederick, Von-Osten-Sacken, Poltoratski Galkin, Bunyakovski, Vahkhanoff, Glukhovski, Tatarinoff, Reintal, Ogorodnikoff Baron A. V. Von-Kaulbars, Sharugorst, Petrovski, P. I. Nebolsin, Prjevalski, Kostenko, Baron P. A. Aminoff. Kuropatkin, Schvarts, Mayeff, Heins, Grebenkin, Arendarenko, Khoroskhin, Hristoff, A. Ivanoff, Butakoff, Ibrahimoff. Zagryajski, A. L. Kuhn, Pantusoff, Minaiyeff, Potanni, Mushketoff, Radloff, Midendorff, Regal and many others to whom geographical science is much indebted for Central Asian explortion and for opening out countries on that continent that were previously quite unknown.

No people understand better than the English that the Russian Colossus, with Central Asia in the embrace of one arm, could, if she chose, stretch out her hand a little further and so gain possession of the old historical routes to India across the Bamian and Bolan passes and that with the other arm Russia holds the whole of eastern Asia.

In this matter then there evidently lies a question of universal importance, for Russia is obviously destined, at whatever cost, to secure for herself a large share in the trade relations with Asia.

For Russia the roads lie open which stretch from the heights of the Ural and of the Caucasus towards both Central Asia and China and up to the very shores of the Pacific Ocean. Like a boundless sea there lies before the gaze of the observer, a vast plain and the traveller as he descends from the mountain range that divides Europe from Asia confidently discerns in the far off horizon the gigantic mountains whereon not so long ago Russian explorers came across traces of Chinese civilisation.

Plains of this extent seem to have been created for receiving those long lines of railway which Russian spirit, force and enterprise are powerfully bringing into existence and will assuredly energetically carry to the end.

At the present time the Russian railway system in the direction of Asia has four terminal points, *viz.*:—

1 Tumen.
2 Orenburg.
3 Baku.
4 Samarkand.

But each of these present *termini* is destined to be the starting point of fresh railway projects with the object of still further penetrating into the depths of Asia.

From Tumen there has been projected that vast Siberian railway system which will connect that point with Vladivostok.

From Baku the Russo-Persian railway system will undoubtedly be carried down to the Persian Gulf and its connection will then be impatiently awaited with one of the stations on the Trans-Caspian Railway and with the Railway system of British India.

With the steady growth and extension of the boundaries of the Russian Sovereignty what else is to be expected?

In the course of the last half century Russia has acquired in Central Asia territory with an area of 65,265 square miles and with a population of more than 10,000,000 souls.

dotte's Corps' upon Apolda, or not have preferred to unite his army on the 14th on the right bank of the Saale, to wait for the attack of the army of the Prince zu Hohenlohe, which he took to be the united Prussian forces, and allow him to begin.

A fight on the 13th October would of course not have been a decisive battle, for it would have affected only a small portion of the French army. But it would still have been a success which might have raised the confidence of the troops and counteracted the mishap at Saalfeld. This success might perhaps have had as great an effect as the battle of Gross Gorschen* had, might have checked Napoleon in his advance, have compelled him to proceed with greater prudence and more slowly, and have gained the Prussian army time to unite and withdraw all together to a position, the line of retreat from which was not threatened. For this purpose it would certainly have been necessary that the main army should hold the pass of Kosen on the 13th and on the 14th have continued the retreat over the Unstrut. On the same day the Prince zu Hohenlohe in conjunction with Ruchel could have followed the retreat as rear-guard, whilst a great mass of cavalry veiled the retreat of this rear guard on the plateau of Vierzehn Heiligen. * * * Then Napoleon on the 14th when he had learnt the retreat of Hohenlohe's corps, would have been obliged to first defile over the Saale in order to pursue, and would probably have scarcely been able to overtake him that day.

Had Napoleon ventured then, in spite of a repulse to Lannes, to prescribe for Marshals Davout and Bernadotte a march on Apolda for the 14th October, the main army would have had an opportunity of beating such portions of these corps as had crossed the river on the 14th October, (just as Hohenlohe's army might have beaten Marshal Lannes on the 13th,) unless the defiles of Camburg and Kosen were already closed on the 13th by the main army of the Prussians. It had had plenty of time to do this, inasmuch as it began its march early on the 13th, and the distance from Weimar to Kosen amounts to hardly 4 miles.

Instead of all this there ensued on the 14th October the double catastrophe of the Prussian army.

That the army of the Prince zu Hohenlohe was worsted on the 14th can, as I have said, not be a matter of surprise considering the overwhelming numerical preponderance of the French and the superiority of their organization and tactics.

At Auerstadt the main army met the head of Mashal Davout's columns, as they debouched, at the right moment for driving them back into the defile of Kosen, for the superiority of the main army was here overwhelming especially at the commencement of the fight. The Duke of Brunswick was even on the point of profiting by the advantage of this position, when the deadly bullet struck him. This put a complete stop to the unity of the supreme command in the Prussian army and the battle was given up as lost, without the whole of the forces having been engaged.

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* A village about 12 English miles S. W. of Leipzig, where a fierce but indecisive engagement was fought on the 2nd May 1813 by the allied Russians and Prussians against the French.

inaccessible stronghold of the Turkoman tribes, distant 515 miles from the Caspian-Sea. From Merv there was pushed on without delay further sections of the Central Asian Railway which now took a N. E. direction towards Chaharjui on the Amu-Daria, a total length of 670 miles. The latter point stands on the left bank of the river at the end of a desitute waste that measures nearly 130 miles in extent. By the end of the year 1887 this section was completed and then the Bukharan inhabitants of Chaharjui gazed with astonishment on the first "fire arabe."

Thus without interruption was constructed a difficult costly line of railway with a wooden bridge across the Amu-Daria of nearly 2⅔rd miles in length. Moreover the work of construction was carried out in a thoroughly satisfactory manner and thereby there was established direct railway communication between the western limits of the Khanate of Bukhara and our chief post on the Caspian, Krasnovodsk. Subsequently an extension was safely made and the iron lines were laid through the Bukharan Khanate (a total distance of 738 miles) and now Samarkand, once, the capital of Tamerlane, and so to speak the heart of Asia, has been connected with Europe by a line of railway which measures some 907 miles in length and all has been accomplished by Russians and with Russian material.

So rapid was the construction of this railway which was carried for nearly one thousand Kilometers across the Turkoman deserts that it now appears as an eloquent specimen of human energy and if we take into consideration the difficulties attending the accomplishment of such a task the results stand out the more prominently: it was done in the face of the hostile attitude of the plundering population of a vast steppe country, the climatic conditions were unfavourable to the prosecution of such an enterprise; an insufficient supply of fresh water, the absence of any sort of vegetation and finally the preservation of the very existence of our pioneers, who in the course of their labours were veritably cut off from the rest of the civilised work were all problems which had to be faced before the undertaking could be brought to a successful conclusion.

Feelings of sheer justice compel us now to look back with feelings of enthusiastic amazement on the late General Skobeleff as the chief of that intrepid, devotedly heroic and valiant force which was able in two short expeditions to conquer those Turkomans who had previously never suffered a defeat. Nur-Verdikhan, the leader of the Akhal-Tekke and Merv Turkomans in the year 1855 utterly defeated the Khivan army in 1871 the same tribes inflicted a heavy loss on the Persians and in 1879 they repulsed a Russian expeditionary force under General Lomakin. As a result of the conquests of our deceased hero, Russia was enabled to rapidly and peacefully undertake the occupation of Merv and to practically incorporate in the Russian Empire the entire province of Trans-Caspia.

In speaking of all this, we cannot preserve silence regarding the priceless qualities of the good natured and naturally modest Russian soldier, through whose instrumentality it has been found possible to subdue by force of arms the wild tribes of Central Asia and at the same

(2.)—On the Prussian side the army was so disposed as to cover the whole frontier from the sea by Paderborn, Eisenach. and the Thuringer Wald to the Austrian frontier. Against it Napoleon marched in close masses, at first certainly in the direction of Dresden and Berlin, but this only because he knew not for certain where the enemy's main forces were to be found, and with the declared intention of throwing himself upon them, so soon as he should meet them. When he believed that they stood before him, he gave the orders, according to the position of affairs, which alone could unite his forces for the general end in view.

(3.)—On the Prussian side there was no attempt to combine the whole forces for a decisive battle: 10,000 to 20,000 men were detached on minor missions which could have been fulfilled by a few cavalry patrols.

They did not mobilize the whole of the troops, had left some behind in the eastern provinces, and what I have not yet brought to your notice—had left a whole corps under the Duke of Wurttemberg as a strategical Reserve. The idea of a strategical Reserve to be kept in hand, in order not to stake all on one battle and in case of defeat to have still a nucleus intact on which the fragments of the beaten troops are to rally, reorganize and prepare for fresh exertions, is a very natural and at first sight obvious idea. * * * It is a mistaken one. If reinforced by the troops reserved for this purpose one cannot overcome the enemy, then without them one is all the more sure to be defeated. Afterwards, this small fraction of the army by itself cannot turn fortune, and must be beaten, when it finds itself opposite the combined forces of the enemy, as the Duke was at Halle.

The French Emperor combined all the fighting men that he could bring to the ground into one single force. He marched in such formation that if the corps moving in front had been obliged to give way, he could have united the whole army for a decisive stroke towards his centre in one day, towards his front in two days. He neglected all other considerations and allowed himself to be not in the least disturbed, because Prussian scouting parties surprised his line of communication. He knew too well that if only he won in the main battle, all the small hostile lateral detachments must give way, like chaff before the wind.

(4.)—We see the Prussian Generals entangled in the old fashioned strategical principles and systems of the past century; in part they are tied down by the old customs of campaigning which take up a great deal of time and fetter the movements of the army—old customs of which Napoleon had shaken himself free.

He recognized no system and no strategical principle but that alone, to do what leads to victory. He had not even a plan of operation. *Je n'ai jamais en un plan d'operation,* he is said to have declared. He marched straight at his enemy and led his troops in such a manner that he could at any time at the proper moment reach the enemy with the whole of them wherever he might meet him.

(5.)—The Prussian Generals several times and even on critical occasions altered their plans without any necessity thereto on the part of either the enemy or events, but solely because another idea found favour. For instance, on the night of the 10th-11th October at Blankenhayn, and with Hohenlohe's corps on the 11th October and on the 13th October.

But when in the time of Napoleon I, the French under the command of Marshal Marmont, afterwards Duke of Ragun, occupied, the country and took upon themselves this civilising mission, matters were at once altered :—*Marmont est monté á cheral pour faire les routes et quand il en est descendu, elles étaiènt terminèes* *

Something similar in respect of celerity but incomparably more important in respect of scale, may be said of the construction of the Russian Trans-Caspian Railway. General Annenkoff, who, after sitting on the coast of the Caspian watching the first steamer unload its cargo of plant, advanced with the growing line from west to east, through Askhabad, Merv, Chaharjui, Bukhara and Samarkand and when at last he ordered the locomotive to stop he saw the railway which he had himself constructed from Uzun-Ada to the ancient capital of Tamerlane, covering a length of 907 miles.

Thus was this Titanic work gloriously brought to an end by this indefatigable general.

Those countries of ancient Turainia from the centre of which there were diffused in times long gone by the first rays of the lamp of civilisation : those distant lands in which Zoroaster instructed the Bactrians of old in the light of his moral teaching, those sovereignties which whilst in the zenith of their existence reflected the luxury and brilliancy of the Courts of Asiatic rulers and then in their turn fell under the attack of powerful conquerors who flooded the land at their will with their wild hordes, have all long past into the shade of historical oblivion, those countries too into which in very recent times, no single European traveller dared venture except at the risk of losing his life at the hand of a fanatical population hostile to every European, are now we may say thanks to the Trans-Caspian Railway brought into direct communication with the rest of the civilised world, and will, henceforth, receive their share of those benefits which are poured on our universe by means of civilisation. This most difficult problem Russia has so gloriously solved.

The Trans-Caspian Railway, from the sea to Samarkand, has now been opened and the train now steams along in safety across the wild steppes of Uzbaks and of marauding Turkomans : steppes that were at one time so famous for the very dangers that they offered to the traveller. Now, however, the traveller can if he chooses journey in the course of ten days, from St. Petersburg to the banks of the ancient and majestic Oxus and there go back in thought to the times of Zoroaster and dream about prehistoric Bactriana.

As carried out by a man possessed of unwearying energy and great strength of will, the problem has been a great one, both in a civilising and in a political sense, if we take into consideration that, by the work of constructing this railway, we have at once seized the life chords of England. Never, in the world's history, has there been such an instance of rapid railway construction, for, in the course of three years and by means of an expenditure of 43,000,000 *roubles*, the Trans-Caspian Railway has been brought to a conclusion, and, thanks to this fact, the

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* Memories du Duc de Raguse.

13th October 1806. Such is the lesson of the war of 1796, when the answer to all these questions could only have been given unfavourably for the French troops perishing in the Maritime Alps; yet Bonaparte conquered. Such is the lesson of the campaign of 1814 in which Napoleon had almost driven the allies to retreat over the Rhine in spite of their overwhelming superiority, and in which he could have negotiated a peace very favourable for himself, if he had been a little less pretentious at the conference of Chatillon. Such in conclusion is the lesson taught by our last wars. Or have you forgotten how before the war of 1866 all the so called voices of "common sense" were raised against this war, because by reason of the superior numbers of the enemy, it was without a prospect of success? And do you remember the opinion which so many held in 1870 that we should lose the first battles against the veteran French arms? * *

The lesson I draw from this is that even if the answer to all these six questions proves unfavourable to us, nevertheless we need not despair. There is always one more chance of victory. The decision to make war cannot therefore depend alone on the reply to six sober questions. There is something else besides cold strategical calculations that is needed to drive peoples and states to so stern, pregnant and weighty a resolution as that is—war with all its sufferings, sacrifices, and horrors. And if honour and the other most sacred possessions of the Fatherland demand that we should take arms, then those sober strategical considerations rank only second. Then strategy must consider itself above all other considerations dependent on and subservient to Policy. The dependence of Policy on Strategy must cease. * * * Thus was it in 1806. In such a case one must hope for those "unforeseen incidents," trust in one's right, and to luck, as it is generally called, or as I prefer to call it, to that Higher Hand which sways the destinies of men. * * *

Whilst the grandiose and vaunted railway projects of European and American engineers do not pass out of the province of the ideal, General Annenkoff's Trans-Caspian Railway, about which not more than eight years ago not even mention was made (though the chances of its construction were none the less dreaded in England), has been finished and now stands as a Russian National Memorial with which however the matter will not be ended, for Russia must of course use every endeavour to convert what is now the Trans-Caspian Railway into a really *Central Asian* line and join it on to the lines of the British Indian system.

This task for the Russian Government appears to be more important than any possible further territorial acquisitions in Central Asia.

If Russia does not hurry with the execution of this task, England will not be slow to prevent her doing so with the object of doing all she knows as quickly as possible to paralyse the future fulfilment of any such project

Englishmen are thoroughly aware of the immense importance that is bound up with the construction of a vast railway system like the Central Asian Railway and so in their not altogether unfounded apprehensions they are now exerting themselves as far as possible to place a hindrance beforehand in the way of such an enterprise and so at once to do harm to Russian trade and industry and increase their own political influence. To this end they are now occupied with the construction of a line of railway from Ismid, through Asia Minor to Diarbekir and thence into Persia and on through Biluchistan to India. In this way they hope to make it impossible for any Russo-Indian railway communication to come into existence.

England does not even shrink from the construction of a colossal bridge across the Bosphorus (which, according to the project of the Engineer Rebling can be made for the sum of 22,500,000 marks, nor do they recoil at those obstacles which stand in the way of any railway construction across the mountain systems of Asia Minor or the waterless steppes of Iran. This they have already shewn by their completion of the costly and extremely difficult military line from Shikarpur to Quetta through the Bolan pass.

With the piercing of the Isthmus of Suez the question of connecting Europe with India by means of a railroad has become one of general interest and from a trade point of view, England above all other nations is the most interested in the carrying out of such a work.

Two methods of steam communication, *viz.*, sea and land can ni no case harm each other by their competition but on the contrary they would rather be of mutual assistance by affording the most convenient and the easiest link for commercial objects and by proportionately increasing trade activity. It would be an altogether different matter were a competition to be set up between two lines of railway to India.

By the opening of the Trans-Caspian Railway a beginning has been made of a line to India via Russia. Such a line would have a total length of 4326 miles and at a given time would acquire a special importance. If the English, on their side, were to continue their railway system from Quetta or Sibi through Kandahar to Herat and Russia were to extend her railway from the station of Dushak through Sarakhs to the same point (Herat), then the traveller can be conveyed from Paris to Shikarpur (on the Indus) in the space of *eleven days*, inclusive of the brief sea journey across the Caspian from Baku to Uzun-Ada.

At the same time such a route would prove the shortest and the most practical, as connecting by rail Europe with the north west frontier of India and as being aligned from Paris via Warsaw, Moscow, Baku, Uzun-Ada, Sarakhs, Herat, Kandahar and Quetta to Shikarpur.

Thus from whatever point of view we may look upon the Trans-Caspian Railway, whether strategical-political, trade-economic, financial, scientific-geographical, civilising-historical, international or patriotic, its completion indisputably presents one of the most important results, which have been so auspiciously attained during the glorious reign of the Emperor Alexander III. Such an event must at once be possessed of importance as affecting Russian interests, both material and moral, and at the same time be the record of immeasurable international significance.

PART II.

ITS STRATECICAL IMPORTANCE.

In its Strategical-Political aspect, the Trans-Caspian Railway is a work that the English most of all dread. In proof of this we may turn to the mass of brochures which dwell on the exclusive danger of this line, above all other projects, to the English possessions in India. To the opponents then of the line in Russia we may point with satisfaction to the circumstance that both as to the idea of its conception and to its actual construction by General Annenkoff, the Trans-Caspian Railway has indisputably proved a happy undertaking, for even the opponents of Russian policy in Central Asia yield due importance to its existence.

No one in Russia has so clearly indicated what an important element has entered into the modern method of carrying on a campaign, by means of the construction and extension of railways for the purposes of war, as the founder of the Russian Military Railway Department, who is also the constructor of the Trans-Caspian Railway. This officer has indeed devoted his whole career to the study of this question and to introducing into the Russian Army special railway detachments to be employed in the construction of railways for military purposes and in the general work connected with the transport of troops. General Annenkoff's practical knowledge of this particular subject was crowned with unusual success for Russia during the progress of the Russo-Turkish war and of the Akhal-Tekke expedition and now we all can with the initiator discern how great is the influence which railways have on war operations and how such influence may be still further increased by the extension of a net-work of iron rails.

The best organisation of the fighting units, the best armament and disposition of an army will in our time receive its true importance only when we succeed in rapidly conveying our troops from their peace quarters to that frontier which is threatened by the enemy, or, in other words, only when we can command an abundance of the necessary transport for the conveyance of large forces, or a net-work of railways of sufficient magnitude to effectively carry out our previously prepared plans of mobilisation.

The military importance of railways is pre-eminently centred in their *strategical* character. Both the conduct of a campaign and the handling of troops in an engagement have, thanks to railways, been rendered in a great measure independent of the conditions of time and place. A campaign is more likely to succeed in proportion to its brevity and the energy with which it is conducted; moreover, both prosperity and civilisation are interfered with, when warfare is unduly prolonged.

The uses to which a railway can be put are now-a-days very varied but the most important role of all, which a railway can play, is at the opening of war operations, when the vital question is contained in the ability or otherwise of despatching as large a force as possible to the most distant frontiers.

Of two hostile armies that one will be found to be in the more favourable conditions, which first brings to a close its primary mobilising arrangements, *i. e.* which is the first to convey its units from their peace quarters and concentrate them at those points which have been selected for the opening of war operations. Thence arises the necessity of recognising in time of peace the increased influence on strategy which is exercised by perfect railway communications.

We will allow that the English are right in their present attitude towards the *Russian* Trans-Caspian Railway, *provided* they have fully made up their minds to adhere to their egotistical policy as touching Afghanistan, the population of which presents almost the sole instance throughout Asia of an honourable, brave and freedom-loving race and a people whose complete independence Russia has always respected and defended from the covetous desires of English interests.

We well recollect the time when Russia had to content herself with her former means of communication, by which alone she could obtain access to her vast and important provinces in Central Asia. We also call to mind the thousand-verst route across the Trans-Caspian steppes to Merv by way of the Mertvi-Kultuk, or the Ust-Urt, or via Mangishlak to the Sea of Aral or to the Amu-Daria, even though we had then opened a line of railway as far as Orenburg. These desert wastes have been whitened with the bones of Russian soldiers, for along them there have passed numerous caravans and fruitless expeditions notably those of the following years; 1717, the party under the command of Prince Bekovitch-Cherksski; 1839 the expeditionary force under General Perovski; 1873 the detachment commanded by General Von-Kaufmann; 1879, the expeditionary forces under, first, General Lomakin, and then General Lazareff. But General Skobeleff's expedition of 1881, which terminated with the capture of the Turkoman strong-hold of Gok-Taba, fully atoned for all the victims that had been previously offered.

As long as Russia's communications with her possessions in the east depended on escape from the drift sands of the desert or from the fierce rays of an almost tropical sun, or from snow storm and tempests or on the chance of not falling into the hands of plundering robbers, so long could there not be even mention made of a close and constant connection between Russia and the provinces in Central Asia which her troops had won for her.

As a *strategic* route and as a base of operations against our enemies in Asia, the Trans-Caspian Railway has already done Russia not a little service, in that it is closely connected with the most remarkable military expedition of later times, that under General Skobeleff in 1880-81, for, in the course of that expedition, there were pushed up from Michael's Bay to Kizil-Arvat troops, heavy guns, war stores, provisions as well as ambulances for the sick and wounded and thus was lightened, to a considerable degree General Skobeleff's road to his crowning victory at Gok-Tapa. By means too of the same railway, was prepared the thoroughly peaceful conquest of General A. V. Komaroff at Merv, a conquest which admitted of the possibility of accomplishing this acquisition without any sort of risk. With all this, the Trans-Caspian Railway has revealed itself as a substantial factor in the happily solved question attending the establishment of a proper frontier line between Russia and Afghanistan, a question which was at first threatened with considerable dangers.

The existence of the Trans-Caspian Railway will also in the future exercise an extremely beneficial influence on the political condition of Bukhara, Afghanistan, Persia and India. Henceforth in Russia at least there will be no cause to dread any breach of the peace, at any rate in the near future, for the successful movement of Russian troops in the directions above indicated may be considered as quite secured, a circumstance which must most materially aid in preserving order throughout the whole of Central Asia.

It would be useless, however to go on enlarging on the extraordinarily important strategical significance for Russia of such a railway, which enables Russian troops to be easily conveyed at any moment from the heart of the Empire or from the Caucasus in any direction and to be concentrated at any threatened point, according to the changing necessities of the campaign.

At present moreover Russia can dispose of very considerable armed forces within the limits of her Central Asian territory, for, in case of need she could move against a foreign foe her garrisons at Askhabad, Merv, Sarrakhs, Panj-Deh, Chaharjui and Karki in the direction say, of India, Afghanistan or Persia, and in support of these forces she could rapidly advance others, from the side of Tashkand, Farghana, Katta-Kurgan and Samarkand, or from Uzun-Ada, the Caucasus and the Volga basin and so on by the Trans-Caspian Railway. Thus, in a very short time, we should have on the spot an army of 100,000 men, dependent, for their transport, not on strings of bullocks or of camels,* at once a very costly and an easily perishable description of military transport, but on a well constructed line of railway. In order too to hurry on the transport of our troops across the Caspian, we might enlist the services of the large Volga Steam Navigation Companies, such as the *Caucasus* and *Mercury* and also of the large fleet of the following Companies:—*Lebed*, *Samolet*, *Volga*, *Russian Steam and Trading*, *Company*, to say nothing, in a case of extreme necessity, of the vessels employed in the Baltic sea which could be brought down to the Caspian through our vast canal systems. In the event of any operations against India, Persia or Afghanistan, such a large army could of course find sufficient support either in the basin of the Volga or in the Caucasus, and so would not need assistance from any other direction.

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* This sarcasm is probably launched at the sorry spectacle which was witnessed in our last campaign against Afghanistan.—*Translator.*

In no other part of the world have natural conditions so clearly pointed to the expediency of such a railway, and therefore the energetic cutting of the steppe and of the desert which covers the Aralo-Caspian depression has solved the problem of establishing suitable communications in this locality, for more circuitous routes and the throwing out therefrom of lateral or parallel lines would have long remained in the province of things to be desired. Moreover towards the principal stations of the Trans-Caspian railway as now aligned there converge all the Central Asian caravan routes and lines of communication, and the gates to these, whether on the Irzish or the Ili, or on the sources of the Sir-Daria and Amu-Daria, are already under the power of the Russian Tsar. It can scarcely then be a matter of doubt that the only just opened Trans-Caspian Railway will assuredly bring to Russia the monopoly of the trade of Central Asia and that, should the present main line be ultimately extended in the direction of India, it will finally establish Russian dominion in that neighbourhood as well. To the vast waterless areas of the Trans-Caspian region, the new railway has given a still greater importance; and, indeed, it appears to be the sole means of removing those difficulties, which would be unavoidable in the event of hostile operations against an external foe, but by this very railway there could be conveyed without the least fear of hindrance, from the Kirghis steppes to the active army, camels, horses and slaughter cattle, a matter of vast importance especially in the case of a force operating in the wilds of Central Asia.

Furthermore, this same railway would, te a considerable extent, lighten the heavy struggle against climatic conditions, by insuring an uninterrupted supply of good water, provisions, forage, ammunition and proper victualling arrangements for the army in the field. All these matters would but the more increase the prestige of the Russian forces in Asia, a prestige which is already founded on their valour, fighting capabilities, military discipline and the excellence of their artillery.

As concerns the opinion which is often expressed by certain of our compatriots regarding the insuperable nature of those difficulties which would face troops in a steppe country, that is a matter for specialists alone to decide, but let us bear in mind that to General Annenkoff's ability, energy and perseverance, aided by the great successes of technical science and by the material means placed at his disposal, and guided by a *State idea*, we owe the sucessful surmounting of all elementary difficulties. The waterless steppe and the work of constructing the more difficult sections of the Trans-Caspian Railway were safely got over with the aid of condensed sea-water and by sinking Artesian wells or by carrying supplies of suitable drinking water on the trucks of the railway itself whilst it was under construction. Then too supplies were obtained by means of a canal system led from distant rivers or by storing the water of artificially opened springs issuing from the Koket-Dagh mountains in carefully constructed reservoirs.

In the drift sands a more serious obstacle was encountered but even this difficulty was overcome by sprinkling the surface of the ground with salt-water and by putting over the track of the railway layers of clay whenever this material could be got. The line was further strengthened by means of branches of *Saksaul* laid horizontally and with the end projecting on either side of the track, thus presenting an obstacles to the moving masses of sand. The neighbouring sand *dunes* too were planted over with such vegetable growths as are used to a sandy soil. And further in the neighbourhood of most of the principal stations along the line there were laid out plantations containing millions of young trees which will in course of time afford material both for fuel and building purposes. Consequently the constructor of the railway has adopted every possible measure, as far as the means at his disposal would allow of his doing, to guard his undertaking from difficulties of all kinds and to insure its future successful working.

Thus then may our Trans-Caspian Railway be likened to a bridge thrown across the inhospitable steppes and sandy wastes and binding Russia meanwhile in stronger connection with her territorial acquisitions in Central Asia.

We very often hear voices raised protesting against Russia's forward movement into the heart of Central Asia but it should be borne in mind by those who give utterance to a sentiment of this description that the successes which Russia has there attained by armed force were *firstly*, necessitated by our having to seek for more natural boundaries to our Empire and *secondly* by the indispensability of taking full advantage of the favourable strategical and political positions which every fresh victory brought with it. Positions which, in a civilising sense, must of necessity acquire a greater measure of importance with the completion of the Trans-Caspian Railway as a guarantee of peace and it may be of further acquisitions of a purely peaceful character.

PART III.

ITS TRADE IMPORTANCE.

The prosperity of Central Asia in a *trade-economic-financial* sense, was, to a considerable degree, raised from the moment when Russian dominion in that part of the world was established by the completion of the Trans-Caspian Railway, and its inhabitants were thereby freed from the predatory administration of semi-barbarous Eastern despots.

The inhabitants of Khiva, Bukhara, Afghanistan and Khurassan are now looking with jealous gaze on their Turkistan and Trans-Caspian neighbours, who are prospering under the mild and just arm of the Russian Government, to whom they well know they are exclusively indebted for delivery from the hands of their petty Muhammadan rulers.

And when the Russians, the so-called *popular-military* rulers, shall be in a better position to bring a still more healthy influence to bear and so raise the economic status of the peoples of Central Asia, law and right will be strictly observed by all the local Begs. Of course at first the power of Russia's armed strength had to be displayed in the interests of the people themselves, and for the due protection of the Orthodox missions in the midst of a Mussulman population.

During the last quarter of a century Russia has accomplished very considerable territorial acquisitions in Central Asia and she has pacified the wild hordes of the steppe and conquered two Asiatic Khanates. Thus she has annexed Tashkand and Khokand, Turkumania with Merv and has brought Bukhara and Khiva into a state of vassalage to herself, and hence the frontiers of the Russian Empire have been advanced almost up to the very gates of Herat (in Afghanistan) and as far as Kashgar, the upper course of the Oxus and the frontiers of China.

The numerous and the diversified races of the Russian Empire (Kipchaks, Kirghiz, Sarts, Tajiks, Turkomans, Dungans, Taranchis) all are now amongst the consumers of Russian manufactured goods, and they are also producers of raw material and produce of all kinds. The Russian Government unceasingly labours for the pacification, organisation development and civilisation of the Central Asian peoples and to this end it has already attained considerable results. The name of the *Ak-Padishah* or "the Great White Tsar," is highly venerated and extolled by all the inhabitants of Asia and they will render to His Imperial Majesty divine honours, whenever they are enabled by means of the Railway to Samarkand to come into his presence. Even now there come from distant countries of the Mussulman world highly revered worthy and popular representatives of Islam and also the chiefs of entire tribes, beseeching that they too may be taken under the protectorate of Holy Russia and be released from the exactions of their oppressors by being enrolled among the number of Russian subjects.

But what is still awaited is the fullest development of the *trade and industries* of the countries along Russia's most distant borders. Up to the present time both the import and the export trade has been chiefly in the hands of Asiatic traders, who of course, chiefly confine their endeavours to exporting from Russia only the cheaper class of goods and those of inferior description, to the destruction of all confidence, on the part of the new buyers, in Russian manufactures generally.

On the other hand, the ill-judged export from Asia of raw produce of poor quality has done harm to the receivers of the same in Russia, and so purchasers in either country are interested in seeing that reciprocal trade relations are put upon a sounder basis.

It is surprising to see how rapidly the Trans-Caspian Railway, which patriotic pedlars at one time sneeringly called "an academic line," how this very railway, after it had once reached the banks of the Oxus, suddenly drew general attention to itself, as being an important and useful link between Russia and her Central Asian trade-depôts. No sooner, indeed, had the first train reached Chaharjui, than immediately from every part of Turkistan, of the Farghana Province, Samarkand and Bukhara there began to pour in a flood of Central-Asian goods and products, and along the new high way there passed to the shores of the Caspian cotton in extraordinarily large quantities. Thence this valuable staple was conveyed northwards, along the Trans-Caucasus Railway, to Russian trade and industrial centres, at Moscow, Ivan-Voznesensk, Kieff and so into the very heart of European Russia (where it has supplied material for more than 900 Russian cotton mills) which at no very remote period, will be in a position to buy up the whole of the Central-Asian raw material and of the extensive cotton-fields in the neighbourhood of Chaharjui, Merv, Khiva, Samarkand and the Farghana province. Indeed, with regard to the question of the development of cotton cultivation in Central Asia, the Trans-Caspian Railway has been very practically aligned and a brilliant future awaits it so soon as the question has been solved respecting its ultimate extension to Chinaz, Tashkand and perhaps to Khokand as well. In such a case it must be remembered all kinds of provisions and equipment for our Turkistan garrisons might then be floated from Chinaz down the Amu-Daria to Kazalinsk.

But to no means of communication has the completion to the Trans-Caspian Railway been of such service as to the Trans-Caucasus Railway, which, after its speedy connection with the Vladikavkaz-Tiflis or the Vladikavkaz-Petrovsk-Baku lines, must far outstrip in its returns lines such as the Rostoff-Vladikavkaz, Griaz-Tsaritsin, Saratoff-Kozloff, Kursk Kharkoff-Azoff and others. The Trans-Caucasus Railway (Batoum-Poti-Baku) has already received a considerable measure of increased importance in consequence of the recent enormous development of the naphtha industry on the west coast of the Caspian Sea, and in consequence of this, the line in question was obliged to add considerably to its rolling-stock, so as to meet the extraordinary demands made upon it for additional hauling power, a circumstance, which in its turn has brought in not a little good to Russian factories and other industries.

It is true, however, that the Trans-Caspian Railway will only reach the fullest measure of its importance, when Russian manufacturers come to understand better their own task in the civilising of the East, when they become better acquainted with the prevailing tastes and requirements of Eastern peoples, and when they begin to satisfy these tastes and requirements with articles of uniformly good quality and as well selected as those they now send to all foreign countries.

Nor would there be in the pursuit of such a course any very special difficulties or competition in the markets of Central Asia on the part of of either French or English goods. Finally indeed these might be altogether driven out of the market and replaced in the markets too of Persia and of Afghanistan by goods of exclusively *Russian* character.

The trade transactions between Russia and Central Asia now show a sum of 30,000,000 *roubles per annum* and these mainly consist of raw produce in the shape of Central Asian exports to European Russia and of imports into the same country of Russian manufactured goods and grain of all kinds, but as the silk and cotton cultivation of Central Asia is improved under Russian skill and capital, the Central Asian exports must principally consist of these valuable staples in a raw state. In like manner as time goes to the number of manufactured goods received from European Russia into Central Asia, there will have to be added leather, fruit and household requisites of all kinds.

Formerly Russia had to go for the raw cotton which she required (from 3 to 4,000,000 *puds* * yearly) to India and America and for this she had to pay in hard cash the sum of 100,000,000 *roubles*, but since the opening of the Trans-Caspian Railway all this has been changed and that railway now conveys to the Caspian the produce of the vast cotton plantations of Turkistan, Farghana and Samarkand, the yield of which will with each year both improve and increase. Even in the Khanate of Bukhara, this has already been the case ever since the Bukharans became convinced that Russia is their best and most steady purchaser. Moreover, as the Trans-Caspian Railway has advanced, the number of Russian permanent and temporary residents in the capital of the Bukharah Khanate has steadily increased and these persons have exercised a manifest influence on reciprocal trade returns as well as on the morals and political vision of the people of the country, and so, in the space of a short time, in the bazaars and markets of Bukhara, there have begun to appear more and more fresh specimens of European goods. Indeed, whole rows of shops in the main street of the bazaar of the town of Bukhara, are filled entirely with Moscow-made calicoes dyed to suit Eastern taste. Amongst other articles too in great abundance are to be noticed writing paper, copy books, note books, ink, steel pens, sealing wax, ink stands, blotting-paper, account books, rulers &c. &c., the presence of all of which articles, in such large quantities is sufficient proof that there is a brisk demand for them all. Then too we notice that imported stearine candles and kerosine lamps are successfully competing with the oil lamps and tallow dips of local manufacture. Then again in the local crockery shops, in which some three or four months ago there was but a very limited assortment of Bukharah tea-pots, there are now large supplies of earthenware plates and dishes of all kinds, as well as of tea-trays, table glass, electro-plated ware and such like high class goods. Of metallic goods of Russian manufacture, there are kettles, *samovars* (or Russian tea urns), copper basins, and other domestic utensils, as well as pitchers of Russian manufacture but of native design, candlesticks, scissors, pocket and table knives, padlocks and the various implements of the carpenter and of the joiner. In the confectioners' shops too, side by side with Bukharan almond sweetmeats, biscuits and various dried fruits, there appear the bonbons of Einem and also all kinds of Russian crystallized fruits. In a word, there have now been opened in Bukhara numerous small shops in which there can be bought almost any article that may be wanted.

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* A pud,—36 English pounds.

The Central-Asian exports to Russia too are as considerable as the imports, their respective values being represented by the sums 15,040,000 *roubles* and 16,675,000 *roubles*, or an excess in favour of the imports amounting to 1,635,000 *roubles*.

Amongst the largest Russian firms represented in Bukhara are the following, the Central-Asian Trading Company, Kudrin & Co., (Head Offices at Brenburg and Moscow), Nadejdi, Caucasus and Mercury, Brodski's Agencies, Count Bobrinski, Durschmidt Dukoff, and of the Yaroslav manufactory.

On goods exported from Bukhara dues are levied at the rate of 5 % and by the treaty of 1873 a tax of 2½ % is chargeable on Russian imported wares.

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Europe at present buys her silk in India and in China but as Central Asia also produces silk of very excellent quality with the opening of the Trans-Caspian Railway it may be hoped that Russia will secure for herself a monopoly of this useful article.

Again in Turkistan and in the Province of Farghana there are pastured from 11 to 12,000,000 head of sheep and in the Khanates of Khiva and Bukhara and in the Trans-Caspian Province there are probably not less than 50,000,000 more. Now as all these animals are shorn twice every year and yield an average per head of 3 ℔s. of wool it follows that the annual supply, of sheep's wool amounts to no less than 1,250,000 puds.

Further more it is reckoned that Central Asia possesses from 400 to 500,000 camels from whom the yearly yield of camel's wool amounts to 150,000 puds from which there are manufactured various webs both fine and course. Turning from these articles of freight which await transport by the newly opened railway we find that the horse supply in the countries East of the Caspian is reckoned at 2,000,000 head and many of the best of these (Turkomans of the *Argamak* breed) have already been exported to Russia but there remain animals of the Kirghiz breeds, all very suitable for Cavalry purposes, the Uzbak breed one of the strongest of draught horses, the Khokandi (a cross between the Kirghiz and the Uzbak) an excellent pack animal, the Karabair (a cross between the *Argamak* (Turkoman) and the Kirghiz, a very strong and handsome beast, very enduring but rather costly.

The mineral wealth awaiting transport by the Trans-Caspian Railway comprises sulphur, saltpetre, alum, ozokerite, lead-ore, naphtha, coal, glauber's and rock salt, gypsum &c., &c.

Then too tea plays in the Central Asian markets an important rôle for it has been computed that the amount which finds its way to the markets of Central Asia is some million puds and this colossal trade might by means of the newly opened railway be converted into a mattor of simple barter of Chinese and Russian goods.

For Colonial produce such as rice, pepper, coffee, indigo, dyes, gum, roots, all of which have at present fallen in the Russian markets there might in the future by means of increased facility of transport by the new railway be a great demand.

It is to be supposed that the number of passengers who go and come in each year between Europe and Asia may be put down at 300,000 souls and were these persons to be conveyed over the new line we should suppose we allot $\frac{1}{3}$ to the carriages of the 1st Class and the rest to wagons of a lower class, arrive at a yearly revenue *per-verst* of 5000 *roubles*.

The conveyance year by year of such a considerable number of travellers, would exercise a great influence on the prosperity of Russia, especially if we supposed that they passed through the length of Russia's European and Asiatic territory on their journey to and from Herat.

By such a route the traveller could reach the frontier of India in the space of 12 days, without exposing himself to a 20 days voyage by sea and without losing on account of his passage a sum of at least 700 francs.

Again from India and from the countries of Asia generally there are despatched to England some 232,000,000 postal covers, the greater portion of which could also be conveyed by the railway that we propose.

The population of India numbers 250,000,000 souls and scarcely any of these ever quit their native land because of having to face a sea route; but were the route to be almost exclusively by land they would willingly visit Europe or at least Russia to whom they now look for freedom from the English Yoke. There would thus be opened out an entirely fresh world of passenger traffic and European travellers would be induced through facilitated communication with India to become personally acquainted with that interesting country.

The traffic receipts of such an extended railway as has been above sketched out would bring in a revenue *per verst* of about 23,000 *roubles* and after deducting from this, say, 55 per cent. on account of maintenance of the line in proper working order, pay of employes &c., &c., these would remain a nett gain of 10,000 *roubles per verst* $2\frac{2}{3}$rds (English miles) an undoubtedly good margin of profit, seeing that General Annenkoff's line in its construction did not cost less than 32,000 *roubles per verst.*

It is the constant desire of the Russian Government that Russian trade on the Asiatic Frontiers of the Empire and in the countries thereto adjacent should be more fully developed and that it should receive great strength and influence. In proof that this is so we may quote the words of His Imperial Highness the Grand Duke Vladimir Alexandrovitch to the merchants of Nijni-Novgorod. "Every effort should be made to the end that Russian goods and manufactures should do more and more to gain for themselves the first place in the markets of Asia."

It would be than an opportune action if the entire trading community of the Russian Empire took advantage of this circumstance and applied itself to the task in an energetic and practical manner.

The Russian Government, however, must be ever on its guard lest at any time there should be set up a competition to the Trans-Caspian Railway on the part of foreigners who are setting up their own factories in Persian territory and who are striving to obtain a market for their goods in the Caucasus, on the Caspian littoral and at Askhabad via Mashad.

It is above all desirable that the Russian Government should energetically protect the Trans-Caspian Railway from the pretensions of the English who are using every endeavour to widen the sphere of their trade relations in the dominions of the Shah of Persia, endeavours that have already met with a fair measure of success under the pretext of opening out the mineral wealth of Iran but with the real object of obtaining a concession for the construction of a vast railway system in Persia to be pushed forward partly from the side of Turkey, partly from the direction of the Persian Gulf, so as to carry a line of railway from the head of that Gulf to Shuster in the basin of the Karem river, Isphahan, Teheran and so on to Mashad. Thus would the Trans-Caspian Railway be handicapped by a most crushing competition and thus would the whole of Khurassan and its great resources be drawn to the side of English industries.

With this object, in addition to Baron Reuter's original concession there have been formed one Anglo-German company and one Liverpool house of business, and all three of these are in the enjoyment of the energetic support of the English Government conveyed through the medium of Sir Henry Drummond Wolff and so they hope to paralyse and render were to extend her railway from the station of Dushak through Sarakhs to the same point (Herat), then the traveller can be conveyed from Paris to Shikarpur (on the Indus) in the space of *eleven days*, inclusive of the brief sea journey across the Caspian from Baku to Uzun-Ada.

At the same time such a route would prove the shortest and the most practical, as connecting by rail Europe with the north west frontier of India and as being aligned from Paris via Warsaw, Moscow, Baku, Uzun-Ada, Sarakhs, Herat, Kandahar and Quetta to Shikarpur.

Thus from whatever point of view we may look upon the Trans-Caspian Railway, whether strategical-political, trade-economic, financial, scientific geographical, civilising-historical, international or patriotic, its completion indisputably presents one of the most important results, which have been so auspiciously attained during the glorious reign of the Emperor Alexander III. Such an event must at once be possessed of importance as affecting Russian interests, both material and moral, and at the same time be the record of immeasurable international significance.

PART II.

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Akcha, Gursivan, Darzab, Andkhui, Badakhshan and the triple states of Wakhan, Roshan and Shighnan (and also of Herat with the mountain districts belonging to that province Hazaras, Firuzkuhis and Mongols) are much more in sympathy with any other ruler, even the Amir of Bukhara, than they are with the Amir of Kabul, for they formerly were either quite independent or else formed part of the subjects of the Khanate of Bukhara and their countries have only recently figured in English Blue Books, and to the surprise of every one, as an integrate portion of Afghanistan, Shir-Ali-Khan having been the first sovereign of Afghanistan to lay claim to them at the instigation of the English.

Russia in the character of Mistress of those vast plains, the Trans-Caspian Province and of Turkistan has long been in search of some natural boundary in the south wherewith she could safe-guard her vast Central Asian possessions. If England stands out for the fulfilment of the treaty of Gundamak which she concluded with the Afghan Amir and still desires to annex the Pishin valley, Russia will in that case be compelled to search for some natural boundary line on the mountains of the Paropamisus or of the Hindu-Kush range and so take Herat and the *Chahar-Vilayat* within the sphere of her own influence. This step must inevitably be taken if England should seriously think of creating for Russia difficulties in Bulgaria, Persia or Armenia or if she forms any intention of taking part in any kind of international combination against, or joins those who are hostile towards Russia.

The following important caravan routes should be placed in direct connection with the Trans-Caspian Railway.

1.—PERSIAN.

(*a*) From Askhabad *viâ* Bujnurd-Shirwan-Chinaran, Mashad, Turbat-Sheik-i-Jam to Herat.

(*b*) From Askhabad *viâ* Bujnurd, Shirwan, Mashad, Turbat-i-Haidari, Khaf to Herat.

(*c*) From Askhabad *viâ* Bujnurd, Mashad, Turbat-i-Haidari, Jumlu, Tun, Birdjan, Nikh, Majir-Abad to Biluchistan.

(*d*) Instead of the Persian trade route which now passes from Astrabad to Nishapur, Mashhd, Khelat-i-Nadiri to Merv it would be better after leaving Astrabad to follow a more north westerly and pass along the line of telegraph through Bujnurd and so to Askhabad where the Trans-Caspian Railway would be struck and a circuitous journey with camels of some 200 miles would then be saved.

2.—AFGHAN.

(*a*) From the southern-most station of the Trans-Caspian Railway-Dushak *viâ* Sarakhs to Herat.

(*b*) From the Merv station on the same railway through Kara-Tapa to Herat.

(*c*) From the Marv station on the same railway through Maruchak, Maimana, Saripal, Balkh, Mazar-i-Sharif, Khulm, Kundaz to Badakhshan.

(*d*) From Chaharjui, along the upper course of the Oxus to Kerki, Mazar-i-Sharif, the Bamian Pass to Kabul and India.

(*e*) From Merv or Dushak through Herat to Kandahar and India. This route undoubtedly existed in old days and must have passed through nection between Russia and the provinces in Central Asia which her troops had won for her.

As a *strategic* route and as a base of operations against our enemies in Asia, the Trans-Caspian Railway has already done Russia not a little service, in that it is closely connected with the most remarkable military expedition of later times, that under General Skobeleff in 1880-81, for, in the course of that expedition, there were pushed up from Michael's Bay to Kizil-Arvat troops, heavy guns, war stores, provisions as well as ambulances for the sick and wounded and thus was lightened, to a considerable degree General Skobeleff's road to his crowning victory at Gok-Tapa. By means too of the same railway, was prepared the thoroughly peaceful conquest of General A. V. Komaroff at Merv, a conquest which admitted of the possibility of accomplishing this acquisition without any sort of risk. With all this, the Trans-Caspian Railway has revealed itself as a substantial factor in the happily solved question attending the establishment of a proper frontier line between Russia and Afghanistan, a question which was at first threatened with considerable dangers.

The existence of the Trans-Caspian Railway will also in the future exercise an extremely beneficial influence on the political condition of Bukhara, Afghanistan, Persia and India. Henceforth in Russia at least there will be no cause to dread any breach of the peace, at any rate in the near future, for the successful movement of Russian troops in the directions above indicated may be considered as quite secured, a circumstance which must most materially aid in preserving order throughout the whole of Central Asia.

It would be useless, however to go on enlarging on the extraordinarily important strategical significance for Russia of such a railway, which enables Russian troops to be easily conveyed at any moment from the heart of the Empire or from the Caucasus in any direction and to be concentrated at any threatened point, according to the changing necessities of the campaign.

At present moreover Russia can dispose of very considerable armed forces within the limits of her Central Asian territory, for, in case of need she could move against a foreign foe her garrisons at Askhabad, Merv, Sarrakhs, Panj-Deh, Chaharjui and Karki in the direction say, of India, Afghanistan or Persia, and in support of these forces she could rapidly advance others, from the side of Tashkand, Farghana, Katta-Kurgan and Samarkand, or from Uzun-Ada, the Caucasus and the Volga basin and so on by the Trans-Caspian Railway. Thus, in a very short time, we should have on the spot an army of 100,000 men, dependent, for their transport, not on strings of bullocks or of camels,* at once a very costly and an easily perishable description of military transport, but on a well constructed line of railway. In order too to hurry on the transport of our troops across the Caspian, we might enlist the services of the large Volga Steam Navigation Companies, such as the *Caucasus* and *Mercury* and also of the large fleet of the following Companies:—*Lebed*, *Samolet*, *Volga*, *Russian Steam and Trading Company*, to say

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* This sarcasm is probably launched at the sorry spectacle which was witnessed in our last campaign against Afghanistan.—*Translator.*

Russia to the north of the Paropamisus and the Hindu-Kush and England to the south of the same natural boundary, the statesmen of Russia and of England should oftener reflect on the words uttered in his own time by a murdered Indian Viceroy. "He, who shall but aid in the attainment of the slightest sincere agreement between Russia and England in Asian affairs, will render a service to the whole human race and especially to the interests of the civilisation and prosperity of the inhabitants of both Empires."

Under the head of Foreign and Russian Literature relating to the Trans-Caspian Province, the St. Peterburg *Novoye Vremya* contains the following interesting summary :

Penkin Z. M. The Trans-Caspian Province 1866-1885. *Alphabetical Index to the titles of books and articles relating to the Trans-Caspian Province and adjacent countries. St. Petersburg* 1888. *Price one rouble and* 20 *kopecks.*

In the course of the past five years, the Trans-Caspian Province has been a subject of greater interest to Europe at large than was South America in days gone bye to the Spaniards. Amongst the number of Russian journalists, there has not been one, who has not set apart in his pages some space, at least, for an exposition of the more recent history, at any rate, of this highly interesting country. Indeed, the interest in it is becoming steadily more intense. It began, first with the expedition under the most popular of Russian generals ; it was continued first by the news of the Russian annexation of Merv and then by the occurrences on the Afghan frontier, which threatened, at one time, to bring about a European war, and it has culminated in the opening of a Russian railway from the Caspian to Samarkand. This railway, by bringing our frontier line in close proximity with Herat, (amidst other conditions), has given birth to new views and other hopes for a country now in complete decay but which, many centuries ago, flourished under Alexander of Macedon, Tamerlane and others. It is sufficient for us to bear in mind that Samarkand was once Tamerlane's capital, that on the site of the modern town of Balkh (in Afghan-Turkistan), according to the expressed belief of certain *savants*, stood the ancient city of Bactria and finally that the ancient town of Morgiana, in the neighbourhood of the modern Merv, contained a population of more than half a million souls. Through this country, there have already travelled several foreigners, in the character of simple tourists, as also those possessed of technical knowledge as well and even the almighty Rothschild himself has, as the telegraph informs us, recently started off for the same part of the world. Abroad too there are now appearing with comparative frequency pamphlets and books dedicated to Trans-Caspia and to Russian-Turkistan, and since many of these publications are turned out in a very elegant style and are filled with good illustrations and consequently must be very costly, it is to be supposed that the countries named are a subject of evident interest to the western world.

Thus, for example, the road impressions of Henri Moser have been placed before the public in a very sumptuous book, with the title *A travers l'Asie Centrale.* This book is adorned with 170 engravings and it also has a map. Although, in a scientific article inserted in the IX Volume of the *Intelligence of the Caucasus Section of the Imperial Russian Geographical Society*, it is asserted that M. Moser's book is "written in a lively, easy, style, and that it will be read with interest," we cannot agree with this remark, since in the work there is not noticeable that amount of observation which is to be demanded from an educated traveller ; indeed the author seems to have got through his task in a very meagre fashion, and to have made the same mistakes, which are so frequently met with in the writings of other travellers. And it is perfectly clear why this is the case, for, as is to be gathered from his own pen, M. Moser journeyed to Russian Turkistan, with the object of securing his own personal gain and *not* with a view of studying the country. For example, in the account of his second journey to Tashkand, he relates how he made a collection of silk cocoons, which he sent off to Italy from Bukhara. A year previous to the appearance of M. Moser's book, there was published, in London, a work by the Revd. Henry Lansdell, a member of the British Bible Society, and this too is embellished with numerous engravings. The title of this publication is *Russian Central Asia*. It is altogether a more serious undertaking than that of M. Moser, and so it has already been translated into several foreign languages, and yet, even in Mr. Lansdell's book, we do not find anything especially striking. In England there is now, indeed, a very rich literature connected with Asiatic questions and all that we are now doing in our recently acquired province, all of which is a source of constant alarm to the English. It is not therefore, surprising that every year there appear in London exactly like baked pancakes brochures with such sensational titles as the following : *The Key of India* ; *The Russians at the Gates of India ; Russian Herat; Russian sentries at the gates of Herat ; The Cossacks on the Pamir*, *&c.* Mr. Marvin, who is for some reason or other described as "famous" in the Journal of the *Caucasus Section of the Imperial Russian Geographical Society*, seems to be the most prolific manufacturer of this class of production, relating to Trans-Caspia and Afghanistan, but his observations of the first named country were made from Baku and of the latter from London. Possessed of a slight knowledge of Russian, and having made the acquaintance in St. Petersburg of several persons well acquainted with Central Asia, Mr. Marvin has found himself able at opportune times, to place before his countrymen books made up of free translations from the Russian, refurbished conversations, produced out of his own memory, and his own political comments, the whole of which mixture is not worth one single hatched egg It now therefore seems as though the title of *savant* can be easily obtained and how little it is necessary to do in order to acquire celebrity in the eyes of our Geographical Society. Rawlinson, Prjevalski, Vambery, Regel, Lessar, Grodegoff, Mushketoff, Kostenko, Kaulbars, these are names which are not indeed of equal magnitude and they belong to various branches of science, still they are names which are borne or which have been borne by serious travellers and explorers. We have only mentioned a few of those whose names come to our recollection as we write, and there are many others so that if Marvin is "famous," how shall we describe those whom we have named?

II.

There has recently been published in Paris yet another work relating to the Trans-Caspian region, entitled *Voyage a Merv. Les Russes dans l'Asie Centrale et le chemin de fer Trans-Caspien* (par Edgar Boulangier. 447 pag. 84 gravures et 14 cartes.

The author is a French engineer belonging to the Department of Communications who visited our new province in the year 1886. After crossing over to the east coast of the Caspian, M. Boulangier travelled by the new railway as far as Chaharjui on the Amu-Daria and on his return journey to Russia, he came by the Georgian Military Road, over the mountains of the Caucasus. On the completion of his trip, M. Boulangier wrote a fairly good book, which his countrymen are reading with interest, more especially because it is well supplied with a number of excellently executed engravings which, to a considerable degree, elucidate the text.

The trade of Odessa, his reminiscences of the heights of Malakoff, the Siege of Sebastopol, the striking regeneration of Batoum, the surprising irrigation system of the Trans-Caucasus waterless waste, the mineral wealth of the Caucasus, the panorama of Baku and details concerning the naphtha industry, the history of the Trans-Caspian Railway, the siege of Gok-Tapa, the future railway to India and its method of construction, biographical sketches of prominent Russians, the story of O'Donovan's captivity amongst the Turkomans, the ancient history of Merv, the ruins of Old Merv, the morals and customs of the Merv Turkomans and their horses and very many other subjects which although treated of in a very cursory manner, yet being dealt with by an educated man would doubtless, be intensely interesting to French readers, the great mass of whom are profundly ignorant about everything which concerns Russia.* Prior to the year 1870, Russia's Eastern possessions had not even entered into the province of French love of knowledge, and this fact was due solely to political causes. Now however Frenchmen are deeply concerned about everything that relates to those whom they regard as their political friends. Consequently, people in Paris now possess a very good notion not only about the power of Russia, but as to what we Russians think and how we work and how we behave towards subject races. French literature, in spite of the ceaseless strife amongst the several political parties in France, appears to be surprisingly unanimous on the subject of that most important question, touching enmity towards Germany and alliance, at whatever cost, with Russia. From the French point of view, then, all that concerns Russians is now *couleur de rose* and sympathy itself. The French share in the siege of Sebastopol they say has only resulted in developing a greater reciprocal respect and friendship between the two nations, who are now shaking each others' hands with the greater cordiality. "Un Francais", writes M. Boulangier, in a letter to Madame Adan, (which appears in the book that we are now reviewing), in *lieu* of a preface, "Un Francais qui á vu les Russes, pressé leurs mains, lu dans leurs yeux, est leur ami." Here then is the reason why, in reading M. Boulangier's book, we constantly come across such epithets as "sympatique," "eminent," experimentè "beau," "heros" and others as applied to persons who were casually thrown across the path of our amiable traveller. Wherever it be, the triumphs of the Russian arms have evoked deserved expressions of praise, and now it would seem that the Turkomans also produce by their appearance, an impression on foreigners. "Mais que ces Tekkes sont donc affreux sous leur accoutrement, grand Dieu" goodnaturedly exclaims M. Boulangier, who considers it so to speak his duty to write civilly of our former foes.

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* How much more can this be said of English people.—W. E. G.

Russian readers, however, of M. Boulangier's book will be mainly attracted by its engravings, as the impressions of the author are not poetic enough to secure their attention; moreover, his views are not original and the sources whence the writer has drawn upon, in order to fill his book are far from deserving confidence, and evidently the author has failed in his discrimination as to their selection. And so it is that we meet with in M. Boulangier's work very grave errors, to say say nothing about the minor mistakes concerning the history of the country. For example, in his comparison of the political position of the English in India with our own situation in Central Asia, M. Boulangier says that we maintain twice as large an army as do our rivals in India; but as a matter of fact, the numerical strength of the Russian forces in Central Asia is almost one-third that of the English forces in India. Again, it is not true to say that the population of British India amounts to only 150,000,000 and that the inhabitants of our own dominions number 6,000,000. Still, all the mistakes which M. Boulangier has made, even the greater ones are as nothing when compared with those about Russia generally that have hitherto been met with in the pages of French journals. Indeed, the number of Frenchmen who have, as yet, seriously studied Russia can be counted on the fingers*

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From the Russian official sources of information for the year 1887, it is apparent that the Trans-Caspian Province, on account of the sterility of the greater portion of its area, and because of the sparseness of its population, can never serve as a source of direct gain to the State revenues of Russia. The average length of the Atak and Akhal *oases* is about 330 miles and their average breadth is only about 14 miles (in some places indeed they are not more than 7 miles broad. In the Merv *oasis* there are about 400,000 *desyatinas* (acres) of land suitable for cultivation. But as regards Panj-Deh and Yulatan, they are entirely destitute of forest growth, whilst in respect of their economic conditions, they cannot compare with the plateau in the delta of the Murghab river. For the development however of the irrigation system of this delta, it is considered necessary to construct a new dam across the Murghab river, at a point some 53 miles above Merv, and this project will cost, it has been calculated, 240,000 *roubles*. According to official returns, the total population of the Trans-Caspian Province amounts to 280,000 souls and the State dues and the land taxes bring in a revenue of about 254,000 *roubles*. It is clear then that in the vast economy of the Russian Empire, the Trans-Caspian Province can play but a very infinitesimal part. Still the same official returns show us what a great importance this province possesses as a trade medium between Central Asia and Russia. Thus in the year 1885 there passed through Askhabad from the interior of European Russia, Persia, Khiva and Bukhara goods of the value of 1,486,000 *roubles* and there were exported from the same province, during the same year, into Persia, Khiva and Bukhara goods to the value of 515,000 *roubles.* In the following year the exports and the imports to and from the same countries were increased respectively to the sums of 632,000 and 1,946,000 *roubles.* The trade returns of Merv too during 10 months of the year 1886, were estimated at more than 1,000,000 *roubles.*

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* So too it may be added of Englishmen.—W. E. G.

But even these brief extracts, from official sources of information, do not give an exact representation of the trade returns of Askhabad and of Merv as connected with outlying portions of the entire province. For instance, a recent telegram informs us that many of the merchants of Bukhara, taking into account, the convenient alignment of the Trans-Caspian Railway, and the rapacious exactions from all goods in transit through Afghanistan, have chosen a new route for their exports from British India into Bukhara, *viz*, *vià* Bander-Bushire, Persia, Askhabad, and, thence along the Trans-Caspian Railway to Bukhara. During June and July* there passed into Afghanistan from Bukhara, Russian manufactured goods of the value of 1,781,400 credit *roubles* and during the same period the goods which passed into the Khanate of Bukhara from Afghanistan were valued at 2,961,103 *roubles.*

The dues levied on such goods in Afghan territory must be exorbitantly high for the merchants of Bukhara to have adopted such a strange route for the transit of their Indian purchases, seeing that the new route is twice as long as the old one, along which caravans have passed almost since the creation of the world.

The port of Bunder-Bushire is situated as is known on the Persian Gulf, so that, in selecting the route above named, the Bukharan merchants have, firstly, to ship their goods to the named port and, secondly to convey them, over villainous roads, through the whole of Persia, in order to get them to Askhabad. Indeed, rather than send their goods all the way from India to Bukara by such a route, it would be better to dispose of them in the ports of the Caspian littoral. Hence, the news sent by telegram from Kizil-Arvat, as above set forth, requires still further confirmation.

We see that it has been stated that, in order to make the Trans-Caspian Railway a thoroughly remunerative undertaking, it is necessary to at once set in hand a number of lateral communications from adjacent countries, but the ultimate future of this railway is, it seems to us, most of all bound up with the question as to its proper terminus on the Caspian Sea. Now the Bay of Uzun-Ada is admitted to be little suited as a point for such a terminus. Indeed, the entire section of the line between Uzun-Ada and Kazanjik, (a distance of 114 miles), presents so many disadvantages and requires such a heavy sum for its yearly maintenance that it has been already deemed expedient to construct an entirely fresh diversion (measuring some 53 miles) between the stations of Bala-Ishem and Kazanjik. Moreover, there is now talk of the expediency of carrying an entirely new line from Kazanjik direct to Krasnovodsk, in view of the importance of this point as a port on the eastern littoral of the Caspian.

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* The year is not stated.—W. E. G.

From the above brief exposition, then, it can be seen how much attention, on the one hand, and what a stir, on the other, our new province is calling forth. In this circumstance there can, of course, be no harm. Neither would there be any harm in shifting the sea terminus of the Trans-Caspian Railway to a third point, or, were a fourth of the entire line to be constructed *de novo*, if only, as the result of it all, real good were to be derived and were the increased export of cotton and other produce of the country to justify the outlay of so much additional labour and money. It is true that in this, as in other matters, "the end entirely justifies the means." We, Russians, are however so apt to seize hold of an idea with enthusiasm, to begin our task boldly, but we very often throw up the business altogether when we are half-way through it, and as a result of our want of perseverance we altogether fail to derive any fruit at all of our own labour, or else we permit either the profit of our own unfinished exertions to be gathered up by foreigners. We may cite, as an example of this, the mineral wealth of the Caucasus, which is gradually passing into the hands of foreign firms, and, what is still worse, into the control of such powerful Jews as Baron Rothschild.

A. B.

THE OCCUPATION OF THE SOUTHERN SHAN COUNTRY AT THE COMMENCEMENT OF 1887.

By Captain A. Wallace, *27th Punjab Infantry.*

Till the late annexation brought Burma into general notice, it may be supposed, few in India ever even heard of the Shan States. From Bhamo on the North down to the Independent Karen States, there are seventy or eighty of these states, each under its own ruler and independent of one another. To the East they stretch away to the frontiers of China, as far as 600 miles from Mandalay. Bordering on the British Shan States are the Chinese Shan States, and those dependent on Siam. The different states are not composed of different tribes, such as are to be met with on our N. W. Frontier. The limits of each state are fixed by custom, and are moreover continually changing. So it is with the rulers. In some part or another of these states, there is almost always a disturbance; a strong chief encroaching on a weak one, an unpopular ruler turned out and supplanted by a popular leader, or rival claimants dividing the state. In the time of king Mindon Min, the Burman Government had these states pretty well in hand, and had Burmese residents and guards at, among other places, Mone, and Mobye, whence the Southern and extreme Southern Shan states could be dominated. At that time the Burmese prestige was sufficiently high to be able to exact a tribute, varying from 3000 or 4000 to 30000 or 40000 rupees a year. On the accession of king Theebaw, the Burmese influence got weaker and weaker, and not only was tribute refused, but a revolt ensued, aiming at the establishment of complete independence and freedom from interference, by the Mandalay court. This revolt was signalised at Moni, by the massacre of the Burmese Resident and his guard, some 200 men in all, in June 1884.

The Rulers of the larger and more important states, are called Sawbas, those of the smaller, Myo-sas, and there is a third class of still less importance called Homve go-mus.

Each Sawba has several Myosas and Homve-go-mus dependent on him, forming one faction in any quarrel or political question. The chiefs of these dependent states being either direct relations, or at all events connected by marriage ties.

The Sawbas in the Southern Shan states are those of Mone, Mobye, Mokme, and Nyaungwe. The ruler of Yatsank is also called Sawba, though really only a Myosa. Mone is the leading chief, and claims indeed, precedence over all other Shan rulers.

On hearing of the revolt at Mone, Thibaw sent an army to avenge the massacre, and nominated the chief of Kyeing Jaung to replace the insurgent Sawba.

Desultory fighting in the neighbourhood of Mone continued for 18 months. At the end of this time, the Burmese heard of the advance of

General Prendergast's force, broke up and retired. The Burmese guard at Mobye broke up, and returned to Burma at the same time.

When the Shan chiefs revolted, there was living at Moulmein, a pensioner of the British Government, a Burmese prince, son of king Mindon Min. From his mother, the Limban Queen, he came to be called Limban prince.

On Thibaw's accession, the Limban prince would no doubt have shared the fate of the massacred princes and princesses of royal blood, but he managed to escape disguised as a Phoongyi, or Burmese Monk, into British territory, and was there well received. He had received a good education from Dr. Marks, and knew a smattering of English. He was received in Rangoon society, and at Government house, and was eventually given an appointment in the civil service. Englishmen who knew him at that time, describe him as an effeminate and conceited prig. He was at the same time, unscrupulous, unprincipled, cunning and ambitious. He soon got mixed up in some dishonourable transactions, taking advantage of the power derived from his appointment. to take bribes and so on. He was therefore removed from his appointment, and settled at Moulmein on a small pension.

Restless and dissatisfied, he formed the idea of setting himself at the head of a confederation of the insurgent Shan chiefs, who after defeating Thibaw's army, and throwing off his yoke, should make the Limban prince king of the confederation. The prince no doubt also had in view, that with the aid of the Shan chiefs, he might be able to raise an insurrection against the unpopular Thibaw, gather together a sufficient following in Burma, and eventually conquer the throne of Mandalay itself.

From Moulmein he had no difficulty in passing up the Salween, and into the Shan states, without passing through any part of Upper Burma, where he might have been intercepted by Thibaw's people. This he accordingly did, and when Thibaw was deposed by the English, there was no immediate opposition to the confederation, and the Limban being left to his own devices, he assumed all the dignity and consequence of a Royal personage.

The two leaders of the confederation were the Sawbas of Mone and Yatsank. Mokme held aloof, and Monje was lukewarm and indifferent. The Sawba of Nyaungwe was hostile. The latter had about 1885 turned his brother out of his capital, and seized the state. The brother wounded and driven out, took refuge in Burma. The usurping Sawba is a coarse, mannerless boor in appearance, but is not wanting in courage or intelligence, and has with great sagacity always taken a line of conduct, leading to his own advantage. The pretensions and intrigues of his adversaries, would have blinded a more superficial man but never deceived him.

The confederation however was strong and he was maintaining himself with difficulty against them. He then turned for aid to the British Government at Mandalay. His application was well received, as giving us a friendly footing, from which our rule over the Southern Shan states might be extended.

Accordingly in January 1887 the first Shan column, commanded by Colonel Stedman, collected at Hemedet. Briefly speaking, it was composed of one wing of the Hampshire regiment, the 3rd Goorkha regiment, of two guns of 1-1 E. D. R. A., and 50 mounted infantry-men.

The distance from Hemedet at the foot of the Shan hills to Nyaungwe is 85 miles, over a rough, broken, and difficult mountain path. As soon as the confederation heard of these preparations they increased their efforts to subdue Nyaungwe, before help should reach him.

Colonel Stedman's column advanced meeting with some opposition, and there was an engagement near Singu. Posts were established as the column moved forward, at Fingaung 22, Singu 36, and Puela 50 miles, respectively from Himedet. These posts each at first occupied by 50 rifles of the Goorkhas, were immediately taken over by the 27th Punjab Infantry, so as not to weaken the Goorkhas.

Colonel Stedman having effected a junction with the Nyaungwe Sawba, next attacked on the 18th February a gathering of the confederation, who were on one flank of the road at a place called Kujjo about 5 miles from it. The Yatsank Sawba was at the head of this gathering, and was prepared to make a determined stand. Stockades and other defences were made ready. The Shans had apparently no idea of what our troops were capable of and the Nyaungwe Sawba gave it as his opinion, that our expedition was too weak in numbers A night march was made on their position at Kujjo on the 18th February 1887, but the Shans though ready could not stand long before the Hampshire men, Goorkhas and Artillery, and after some defiant shouting and firing they bolted. The jungle and hilly ground caused our troops to miss cutting them off as they ran, so that nearly all escaped.

The confederation however was for the time broken up and disheartened. Colonel Stedman's column arrived on the banks of the lake, on which Nyaungwe is situated, about the 20th February. A site was chosen for the fort, to contain the Residency of the Political officer and his assistant, and the garrison of the Shan states. The works were immediately begun under Lieutenant Baddeley, R. E., and half a company of Bombay Sappers. With these, and working parties from the Hampshire regiment and the Goorkhas, rapid progress was made in the construction, and out of compliment to the commander of the expedition, the newly occupied station was called Fort Stedman.

It may be as well here, to give some description of the place and its surroundings.

Nyaungwe lake is 9 miles long, and 3 miles broad, at its widest point, it is egg shaped. with its broader side at the N. On the north for some distance there is a stretch of swampy rice fields, beyond which again, there is jungle. Towards the S., there is similarly a long stretch of swampy ground, through which a river flows for some 80 miles, eventually losing itself in a swamp. The ranges of hills run north and south on each side of the lake at no distance from it. Fort Stedman is on the east side. It is ¾ of a mile from the lake, and some 300 feet above it. The lake itself is 3000 feet above the level of the sea. The heights of the hills, are from 4000 to 5500 feet. The march from Hemedet is made in seven days, one big pass is met with, and several smaller ones. At first numerous streams had to be forded and the path even run along the bed of these streams. Work on the road was taken in hand, as the columns advanced, and it was much improved, bridges being built where necessary. The rains in the hills are very heavy, and as it happened, particularly so in 1887. The whole of the bridges first constructed, were carried away about the end of July, and a great deal of the new road also slipped down rendering communication very difficult, but as soon as the rains cleared a bit, work was resumed, and such contingencies guarded against. The country is rich, but very sparsely inhabited, the wants of the people are few. They exist principally on rice, living in bamboo huts. They are very lazy, and extremely impatient of any restraint. They are quite unamenable to any sort of discipline, and are thus unsuitable for any description of service, except on the roads, or where they are allowed to work in their own way and take their own time. At first the men would not work, for less than twelve annas, nor the women for less than six. Now the ordinary rate a day is eight annas for a man, and six annas a woman. Women do most of the hard work either on the road, or in the fields, but the men are first rate carpenters, and all are very handy at turning out things made of bamboo, their only tool being their dak or cleaver. In and about the lake, the population is semi-aquatic. There is a deep fringe of reeds round the lake, extending some 400 yards from the bank, and on the borders of the reeds, the villages are built on piles, in the water, and all moving about even from house to house is done by boat. And not only houses, but large phoongyi Khowns, or monasteries, are thus built over the water, with pagodas, on artificially raised islands. The lake is not more than 12 to 15 feet deep, in its deepest parts. The greater part of its bottom, is covered with weeds, growing 6 or 8 feet, so that for half a mile from the shore, the weeds are on, or close to the surface. The boats are all, nearly flat bottomed, dug out canoes, the smaller made of a single piece of wood, but most of them made up out of four or five blocks of timber. The ordinary sized boat carries 8 or 10 people comfortably. The larger ones, used by the Sawba and Myosas, can carry fifty people. Though steady enough, their flat bottom makes them seem very shaky to new comers. They row with paddles, standing, and balancing themselves on one leg, wielding the paddle with one arm, and with the other leg curled over it. They can thus travel a good pace, and rowing 20 miles, at the rate of 4 miles an hour does not appear to tire them.

The Shans, before we improved our aquaintance with them, had the credit of being a very warlike, wild and formidable people. No greater mistake could have been made, for in truth they are a very simple, gentle, unwarlike, indolent race. The army of a Sawba in peace time, consists of personal retainers. In their services they get their food, and are allowed certain privileges over ordinary villages. Their pay consists of what they can extort from the latter. In war time each village has to supply so many men, and so much money. The arms are the usual nondescript collection of muzzle loading flintlocks, and muskets of every date, and from every country. Old matchlocks are among them. The Sawbas and Myosas themselves, generally have a snider or two, and three or four other breech loaders for their own personal equipment, but for these, ammunition is a difficulty.

To understand how the Burmese troops could be 18 months fighting round Mone, and how the followers of the confederation, could be more than six months, trying to subdue Myaungwe, the Shan idea of fighting must be grasped. Just as in the last century in Europe there were apparently certain fundamental rules, by which generals marched and countermarched on a cut-and-dry system and went into winter quarters regularly, so, it seems with the Shans a fixed rule for opposing parties not to come within a fair range of each others guns. Stockades are built by both parties, within seven or eight hundred yards of one another, and there they remain, blazing away at each other in an aimless sort of way until their stock of ammunition, provisions, or patience is exhausted; and whoever can hold out longest, is the victor. The average of one man wounded, in a fortnight's engagement, would not be an exaggerated estimate. All this about the Shans, was not however known at the time of Colonel Stedman's arrival. The country and people were new to every one, and they still kept up their reputation for valour. Their appearance was in favour of this, they are finer and bigger, better looking men than the Burmans. Perhaps not so wiry, but still strong. As far as death goes, they do not seem to be cowards, any more than the Burmans. It is merely that this is their custom of fighting, for as a rule it is with people of their own race, language and blood that they have to do, over questions which concern those engaged very little personally, and they have none of the patriotic sentiment, such as instigated the so called dacoits of Upper Burma, in their stubborn resistance to the British annexation.

To return to Colonel Stedman's column. Orders were received for its relief, accordingly 300 men of the 27th P. I. under Major Sweetenham of that regiment arrived at Fort Stedman on the 8th March, and on the 12th, the bulk of the original column left for India, that is, the whole of the infantry, Hampshire regiment and 3rd Goorkhas. The two guns of the mule battery, and the Mounted Infantry remained at Fort Stedman. On this day the whole of the troops remaining were able to move into the bamboo huts, erected in the fort for their accommodation.

These huts were comfortable enough, and all had raised platforms for the men to sleep on. From top to bottom, they were made entirely of bamboo.

Bamboo posts. bamboo pegs to keep them together, split bamboos for flooring, and bamboo matting, or chattai, for walls, doors &c. All, at least, except the thatching of grass, and a few thongs of cowhide, to bind the more important parts together. All ordinary binding was done with twisted bamboo rope. Very frail these buildings looked, but as it turned out they can stand a good deal of wind, perhaps because they let it all pass through, and so offer little resistance. The thin grass roof was also found a much better protection against rain than one would expect, as it is easily seen through.

From the time the confederation had been driven to the winds at Kujjo by Colonel Stedman, the Political officer Mr. Hildebrand had been busy. The idea was, to induce the Mone and Yatsank Sawbas to submit without further fighting; that they should abandon the idea of a confederation, under the Limban prince; and that the latter should give himself up, and retire on a small pension, to where ever the Government might think fit to send him. Rs. 250 a month was the amount authorised to be offered to him. Letters to the above effect were sent to all the adherents of the confederation. Demoralised by the sudden turn affairs had taken, in the first shock of surprise, they were willing to agree to anything, and it was accordingly settled that Mr. Hildebrand, with a suitable expedition should proceed to Mone; that all the chiefs should come in and submit themselves there, and all questions relating to the future settlement of the country be peacefully decided. The reason given for their not coming to Myaungwye to do all this, instead of Mr. Hildebrand going to them at Mone, was that it was against their etiquette, Mone being superior to Myaungwye, and they could not bring themselves to submit thus in sight of their late obnoxious enemy. It seems certain that at that time they had no idea of the power and qualities of the British or of the British Government.

The Goorkhas and men of the Hampshire having left, everything was prepared for an expedition, to be composed of

2 Guns Mountain Royal Artillery.
170 Rifles 27th Punjab Infantry.
40 Mounted Infantry
with 6 Officers among them.

The preparation was no easy matter. Colonel Stedman's column left behind no treasure, no commissariat establishment to allow of even a native Agent accompanying the column, and for all transport there were two drivers and seven pack bullocks.

Camp equipage, provisions for 25 days, rum in kegs, reserve ammunition, also some entrenching tools, all had to be carried. Mr. Hildebrand however declared that any number of their bullocks and coolies would be procurable. The number required was 380 bullocks and 400 coolies. 50 more coolies were required for the Political officer himself, his assistant, and for Lieutenant Jackson of the Survey Department, and his equipment and followers.

The Shan bullock is a wonderfully handy and useful animal. Its gear consists of a pad, nose ropes &c., of two tubular baskets, about 16 inches in diameter and 18 or 30 inches deep. A stick runs through these, by which they are fitted tight to the bullock's sides, which are protected by a piece of matting; if properly balanced they will rarely tumble off and can travel over the most difficult and broken path. There is this objection however, that nothing will induce the owners to load up anything that will not fit into these baskets and balance properly, nor will they, except under pressure, carry more than 120 lbs. at the outside on each bullock. They are thus the very best transport possible for bags of atta, paddy, &c., but nothing in the way of camp equipage, entrenching tools, or boxes and cases, not even an ammunition box which is too long, can be carried on a Shan bullock. The number of coolies required seems enormous, but it must be considered that 10 lascar pals for the men of the 27th P. I. alone, meant 80 coolies, then reserve ammunition 80 more, and so on with everything else, rum kegs and tea cases, bakery, butchery &c.

The start was fixed for the 15th March. Regimental money belonging to the 27th P. I. was to be used as treasure. On the 14th the bullocks turned up, and were loaded. It was still a matter of some anxiety whether the 450 coolies would arrive, as arranged, next morning. Although the Sawba of Myaungwye had promised to supply the coolies, it was suspected that he was not anxious for the success of the new expedition. He was afraid that we might settle our station, the garrison and the Political officer at Mone, and that he would be deprived of any prestige, and all pecuniary advantages which he derived from our being settled in his territory. It is probable he intrigued against the start; and that coupled with the withdrawal of the wing of the Hampshire and whole of the Ghoorkha regiments, to take whose place only 300 of the 27th P. I. had come up, caused the confederation to hesitate, and on the evening of the 14th, a few hours before the settled starting time, Mr. Hildebrand received communication, asking him to delay moving, while the chiefs met and had another consultation, and came to some decision.

It was disappointing, but this expedition had at once to be postponed. If for no other reason, it was quite impossible to move, unless the chiefs had assisted with bullocks and coolies. Those obtained at Myaungwye would not have gone outside that territory for more than one or two marches. If any active hostilities had taken place, they would all probably have bolted and left the column in great straits. But besides this, even if no hostilities had arisen, the chiefs would merely have avoided the Political officers, and nothing would have resulted.

After this the Political officers went on addressing letters, while the chiefs of the confederation continued shilly shallying. They were afraid to molest us, afraid of ourselves and of what our intentions might be, and could not bring themselves at once to right about, give up the Limbin, and what they might consider the national cause, and to which they had bound themselves by solemn declarations and oaths. The Sawba of Yatsauk was particularly hostile, and this hostility proceeded, not from any motives of reasoning but from sheer personal hatred of the English.

Encouraged by our inactivity, he began to give trouble. The capital Yatsauk 30 miles to one flank of our line of communication was a source of danger to us. There was at the time no store of rations at Fort Stedman, and as it was expected that on account of the heavy rains, no communication could be kept up with Burma, after about the 15th May, it was of vital importance to keep the road open for the Shan bullock drivers, who were bringing up the stores. The latter began to consider the road too dangerous. Our posts were 20 and 30 miles apart and it would have been impossible to keep up a sufficient patrolling, to make it perfectly safe, there being only fifty men in each post. Petty dacoities in the district became frequent, a gathering of dacoits was reported four miles on one flank of the road, about half way to Hemedet, and an escort of sepoys at Heho were reported to have been fired on at night.

Active measures became imperative; only one month, (April), remained in which troops might move over the hill paths. Major Swetenham, commanding the troops consulted with Mr. Hildebrand, the Political officer, and a march on Yatsauk was determined on to bring matters to a peaceful issue if possible, but in any case, obviate the possibility of danger from that quarter in a season when our troops could not move.

The telegraph line was not open and a letter took seven days to get to the nearest telegraph office. These officers had to take all the responsibility of the movement on themselves. This decision was arrived at on the 29th March. The 3rd of April was fixed on for starting. One hundred rifles of the 2nd Queen's Royal West Surrey Regiment had arrived on the 23rd and 25th of March, but there was still no treasure, no transport, and no commissariat agent available for out station work. The transport brought up by the Queens' had been immediately sent back, to bring up stores, when no movement was anticipated. The column was to consist of—

1	Officer and	2	Guns Mountain Artillery.
1	„	50	Rifles 2nd Queen's.
4	„	150	„ 27th P. I.
1	„	40	Mounted Infantry.

For the rations, baggage, camp equipage and reserve ammunition of the above, were required,

315 Shan bullocks.
248 Coolies.

Mr. Hildebrand and the civil department took 50 more coolies making a total of about 300 coolies.

These were not forthcoming on the 3rd so the departure was postponed to the 4th.

The trouble given by the distribution of the Shan bullocks was enough, but anything like that given by the coolies is hard to imagine. They are naturally idle and independent, do not understand obedience; eight annas a day was no inducement whatever, considering that for a light days work on the road they could get 12 annas or even a rupee, there was no way of punishing them, and it was impossible to march and keep them at night as prisoners. However on the morning of the 4th all the bullocks and half the coolies turned up and at about 12 A.M.; all except the 27th P. I. got off. It looked as if a start would never be effected. This party got to Bowe Tat the first march, about 10 miles, by 5 in the evening, but got drenched with rain, so they had a wet camping ground, and as it poured the whole of that night, they had rather an uncomfortable time.

The 27th P. I. waited till 3 P.M. for the coolies that Mr. Scott the Assistant Political officer promised he would send back from Nyaungwye, the Sawba's town, about six miles off, and which had to be passed through, but they never came. At that time some 50 were still wanting; boats were however made use of, and the 27th P. I., got as far as Nyaungwye by dark, three miles short of the original halting ground, where the other party was, and they also had a wet night.

the stations of Bala-Ishem and Kazanjik. Moreover, there is now talk of the expediency of carrying an entirely new line from Kazanjik direct to Krasnovodsk, in view of the importance of this point as a port on the eastern littoral of the Caspian.

From the above brief exposition, then, it can be seen how much attention, on the one hand, and what a stir, on the other, our new province is calling forth. In this circumstance there can, of course, be no harm. Neither would there be any harm in shifting the sea terminus of the Trans-Caspian Railway to a third point, or, were a fourth of the entire line to be constructed *de novo*, if only, as the result of it all, real good were to be derived and were the increased export of cotton and other produce of the country to justify the outlay of so much additional labour and money. It is true that in this, as in other matters, "the end entirely justifies the means." We, Russians, are however so apt to seize hold of an idea with enthusiasm, to begin our task boldly, but we very often throw up the business altogether when we are half-way through it, and as a result of our want of perseverance we altogether fail to derive any fruit at all of our own labour, or else we permit either the profit of our own unfinished exertions to be gathered up by foreigners. We may cite, as an example of this, the mineral wealth of the Caucasus, which is gradually passing into the hands of foreign firms, and, what is still worse, into the control of such powerful Jews as Baron Rothschild.

A. B.

opposite side beyond the causeway there was rising ground covered with jungle. It was an excellent place to defend, and a good deal of stockade work had been built for that purpose, but they omitted to destroy the bridge, and only put down slight brush-wood obstacles across it, at once removeable.

The people behind the stockade fled at the sight of the mounted scouts, firing but a single shot. The column moved on to Mylee 4 miles distant. Yatsank was now 13 miles off. The march was fixed to Magi-gon, a village 3 miles on this side. The coolies always passed the night in villages outside the camp; an enterprising enemy would have dispersed them with no trouble whatever. The Shan bullocks camped close to the column, and under its protection, as the bullocks could not have saved themselves like coolies in case of molestation. In the camp of the column itself there was no shelter or room for the coolies, luckily the Sawba never thought of dispersing the coolies, and so rendering the column immovable, and after about four hours delay on the next day the 10th, Magi-gon, the appointed camp, and within sight of Yatsank, was reached.

Had the troops at once moved on Yatsank better results would have been obtained, but considering the nominal opposition hitherto met with, Mr. Hildebrand was still in hope that all might be arranged peacefully, by not hurrying or frightening the Sawba away. There was also the serious consideration of arranging for the Government of the territory, in case of the Sawba's flight, and that the latter might become a troublesome dacoit leader, without any interest at stake, such as he now had in his territory. Afterwards it was learnt that the Sawba had come out to look at the column marching in. Though the number of fighting men was not large, the train of bullocks and coolies, together with the troops, as they streamed down into camp, over the brow of a hill, must have been rather an imposing sight, sufficient to daunt the courage of more warlike men than Shan Sawbas. Anyhow the Sawba got back to his place as fast as he could, and hastily collecting his wives and more portable belongings, did not wait to hear anything more, but went out of the opposite entrance to Yatsank, to that where the column was, and as it subsequently transpired, did not stop to take breath till he had put the river Salween and hundreds of miles of country between himself and the column.

While he was doing this, Mr. Hildebrand was sending off a final conciliatory letter. In answer to this representatives came out from the town, to place themselves and the town at our mercy. They found Major Swetenham and Mr. Hildebrand out on the road to Yatsank, with a reconnoitring party of Mounted Infantry. They were fired on by some dacoits on the outskirts of the town who dispersed at the first volley fired at them. It was getting dark, so the troops returned to camp without entering the town.

In case the Sawba might return in the night, on hearing the town was unoccupied by us, and do some mischief in it; or in case of any dacoits still in the town, making any disturbance, a picket of 50 rifles was despatched late at night, who without shewing themselves to any one, in or out of the town, took up a position on the road along which

THE OCCUPATION OF THE SOUTHERN SHAN COUNTRY AT THE COMMENCEMENT OF 1887.

By Captain A. Wallace, *27th Punjab Infantry.*

Till the late annexation brought Burma into general notice, it may be supposed, few in India ever even heard of the Shan States. From Bhamo on the North down to the Independent Karen States, there are seventy or eighty of these states, each under its own ruler and independent of one another. To the East they stretch away to the frontiers of China, as far as 600 miles from Mandalay. Bordering on the British Shan States are the Chinese Shan States, and those dependent on Siam. The different states are not composed of different tribes, such as are to be met with on our N. W. Frontier. The limits of each state are fixed by custom, and are moreover continually changing. So it is with the rulers. In some part or another of these states, there is almost always a disturbance; a strong chief encroaching on a weak one, an unpopular ruler turned out and supplanted by a popular leader, or rival claimants dividing the state. In the time of king Mindon Min, the Burman Government had these states pretty well in hand, and had Burmese residents and guards at, among other places, Mone, and Mobye, whence the Southern and extreme Southern Shan states could be dominated. At that time the Burmese prestige was sufficiently high to be able to exact a tribute, varying from 3000 or 4000 to 30000 or 40000 rupees a year. On the accession of king Theebaw, the Burmese influence got weaker and weaker, and not only was tribute refused, but a revolt ensued, aiming at the establishment of complete independence and freedom from interference, by the Mandalay court. This revolt was signalised at Moni, by the massacre of the Burmese Resident and his guard, some 200 men in all, in June 1884.

The Rulers of the larger and more important states, are called Sawbas, those of the smaller, Myo-sas, and there is a third class of still less importance called Homve go-mus.

Each Sawba has several Myosas and Homve-go-mus dependent on him, forming one faction in any quarrel or political question. The chiefs of these dependent states being either direct relations, or at all events connected by marriage ties.

The Sawbas in the Southern Shan states are those of Mone, Mobye, Mokme, and Nyaungwe. The ruler of Yatsauk is also called Sawba, though really only a Myosa. Mone is the leading chief, and claims indeed, precedence over all other Shan rulers.

On hearing of the revolt at Mone, Thibaw sent an army to avenge the massacre, and nominated the chief of Kyeing Jaung to replace the insurgent Sawba.

Desultory fighting in the neighbourhood of Mone continued for 18 months. At the end of this time, the Burmese heard of the advance of posed of Shan bullocks and coolies was sent down to Hopone, and the column reached Maingpun on the second day, the 24th April.

On arrival, it was reported that the Sawba was 6 miles north of his town, opposing the Legya people Major Swetenham took the Mounted Infantry, a few of the Infantry, and with the two Political Officers proceeded straight on that same afternoon to the scene of the conflict The Legya and Maingpun men were found engaged in true Shan style. Both in stockades about 800 yards apart, firing briskly in each others direction. There were about 800 Legya men. On getting a letter from Mr. Hildebrand the firing of the Legyamen stopped, our men got between the two parties, and Mr Scott, Assistant Political, rode up to the Legya stockades, and called their leaders to a meeting. The engagement had been going on for about 10 days, during which one man was very severely wounded.

The meeting took place there and then and peace was made. As it happened the Legya men could not have kept it up much longer, as they were running short of rice. The end of it was, that the Maingpun Myosa gave them all something to eat, and they went back to their own territory happy. All went favourably now, the cause of the Limban was seen to be a losing one and done for. They were only too anxious to do all in their power to win our favour, and but for honorable motives would no doubt have handed up the Limban as a prisoner. The latter was now but a useless expense to them, and they were only too glad at the idea of our coming and taking him off their hands. The Prince was too afraid to come in, and declared himself too sick to move. To induce Mr. Hildebrand to come on to Moni, the Sawba of that place sent his brother-in-law to Maingpun. The entreaties of the latter were earnest, but unfortunately there were no rations available to take the column beyond Maingpun. There were only 4 days in hand, and for a letter to reach Fort Stedman and rations to be sent out would have taken at least 8. By the main body returning at once, sufficient could be left behind for 50 rifles, to last till more could be sent. The responsibility with Major Swetenham lay in detaching so small a party to Mone, eight marches from Fort Stedman among a people who but lately had been unfriendly, on whom it would have to depend on for bullocks and coolies, for their being able to move, and over whom the Limban prince might still have sufficient influence, to cause them to take advantage of our weakness; on the other hand, the great benefit that would accrue, from the withdrawal of the Limban prince from among these people, before the rains set in, and compelled us to be inactive, was very considerable. If left for five or six months unmolested, the Limban might have caused us all manner of annoyance. This party therefore of 50 rifles under Captain Wallace, 27th P. I, was left with Mr. Scott the Assistant Political Officer at Maingpun; while the column hurried back to send out rations.

Little trouble was felt from carriage, as all the chiefs of the places passed through were only too anxious to do all they could. They were altogether much more obedient and respectful than the Myaungwye Sawba, who really owed everything to us.

Rations reached Captain Wallace's party at Maingpun on the 1st May, and they pushed on to Mone, which they reached on the 5th.

A good deal of rain fell about this time: on one day they had to halt, and the wet tents and slippery roads gave trouble.

On arrival at Mone the Sawba did not immediately come and call on the Political Officer, his excuse was illness, but he was more probably holding out, on an exaggreated notion of his importance, and hoped Mr. Scott might come to him first. Seeing there was no chance of this, he came on the second day. The Limbin's plea of sickness was accepted, and he was called on. Dr. Manden the Medical Officer with the party, found him suffering more from anxiety than anything else. Perhaps it was as well that only such a small party had come, otherwise he might have have bolted. As it was he was reassured, and finding that his game in the Shan States was played out, all that he now attempted, was to secure the best terms he could. He was at this time lodged in separate bamboo buildings, a short distance from the residence of the Sawba, the whole of whose buildings were also of bamboo. The Prince had a following of 40 or 50, but though many had left him, he kept up the mockery of a royal court. All natives coming into his presence, grovelled on the ground on their stomachs, with clasped hands, and he had some royal appurtenances, such as gold dahs, peacock feather fans &c.

The first thing he stipulated for was being held free from any accusation, for anything that he might have committed whilst in lower Burma. He evidently mistrusted us, and imagined the Government might rake up some former misdemeanour, apart from anything he had done in the Shan States, and on the strength of this, disallow the pension agreed on, perhaps even imprison him. This and his life was promised. He also tried hard for an increase to the 250 rupees a month, which Government had considered sufficient for all his wants. This however could not be done. To shew how distrustful the Limbin was, it may be mentioned that he asked for the signature, not of Mr. Scott only, but of all the officers with the party, four in all. Everything was done to humour him as from the position the party was in, as regards men and transport, rough measures had if possible to be avoided. As long as he was at Mone he was allowed perfect freedom, the only alternative was making him a close prisoner, which would have been risky. Half measures would have been useless, and might have caused him to take fright and bolt. Everything was settled for an immediate return to Fort Stedman, as rations tied one down to time. It was intended to march the troops by a southern road, passing through Mokmi, an important town 25 miles S. of Mone, the head town of a rich and flourishing territory. The Sawba of Mokmi had held aloof from the confederation. The Limbin was much excited when this was proposed to him, as he greatly objected to these people seeing him, and triumphing over him in this misfortune. A direct return was agreed on. The Sawba of Mokmi had already made preparations to receive the troops. He might have been hurt at the apparent neglect of our officers, in not also calling on, and receiving him. It was too far to move the 50 rifles in the time remaining, also it was thought better to remain near to the Limbin, but Mr. Scott, Captain Wallace and Lieut. Jackson of the Survey Department rode over, met with a most friendly and honourable reception, and were able to get back to Mone on the 31st day

The appearance of the British Government was a genuine relief to all. Since the days of the first revolt against Thibaw there had been no tranquillity. About a third of the former number of houses in Mone remained. Fields had remained uncultivated, rice, their staple food, was at famine price. Our arrival meant that this was all over. No escorts were necessary any more near Mone, and since that time there has been no sign of trouble.

On the return to Mone several minor chiefs came and submitted, and promised obedience. The Sawba of Moni asked that the British flag might be set up at his palace, as an expression of the new state of affairs; which flag would be in his charge on our departure. His loyalty and sincerity were so apparent, that this request was agreed to, and with such solemnity as possible, the British flag was set up at Mone on the 11th May 1887, Mr. Scott running it up the pole prepared by the Sawba, while 30 of the 27th P. I. presented arms, the bugle sounding a salute, and the ceremony closing with a march past the Union Jack.

On the 13th the column left. Rain was frequent, the road execrable. Twice the rear guard did not come in till the morning after the start. They were belated one day, owing to rain having made the path up to a hill utterly impassable; once out of Mone, the Limbin was practically a close prisoner. Troops camped round the Zyat, or other building told off to him, and sentries never let him out of sight, day or night. He started from Mone as ceremoneously as he could. In a new bamboo howda ornamented with tinsel and red, and with gold umbrellas complete. The umbrellas were closed after half a mile, and never obtruded themselves again, and the elephant went so slowly, that the prince after two miles, had to dispense with that too. His following even on the road got smaller and smaller. He rallied at Bye-in, a good sized town, two long marches E of Fort Stedman. It had been a place where he had great influence, he had lived there some time, and married one of the chief's daughters. Here the people on the road squatted at his approach, and unknown to Mr. Scott, the state umbrellas were unfurled. As soon as it was known that he was going to pose as a hero, Mr. Scott ordered the umbrellas to be shut up, and as a punishment, instead of halting at Bye-in, the party went three miles on, to where a river had to be crossed by boats. There had been formerly a good wooden bridge over this river, but it had been torn up to build stockades with on the opposite Bank to Fort Stedman, shewing that at one time, they had fully intended to oppose our advance. It may here be mentioned, that between Yatsank and Maingpun, near the latter place, a freshly cut stockade, proved that till we had driven out the Yatsank Sawba, they meant to resist and that if the expedition to start from Fort Stedman to Mone direct on the 15th March had been persevered in, it would not have been well received.

At this river, the last occasion happened on which trouble about coolies was suffered, for the party had to wait from 7 in the morning till 3 in the afternoon, before the full quota arrived. On this march one sepoy and two coolies got spiked in the feet, the instep of one of the coolies being completely transfixed. The bamboo spikes had been put down in the grass, on either side of the path, to obstruct two months ago our approach and no one had taken the trouble to search for, and take the spikes up again, after all had been settled.

The Limbin was brought into Fort Stedman on the 20th May, and left a few days afterwards for Rangoon.

This expedition practically settled the whole of the S. Shan states. That is to say the territory in the Shan hills S. of Mandalay, W. of the Salween and N. of the independent Karennees.

The fate of the Sawba of Yatsauk was a warning to all the others, that disobedience and disloyalty would forfeit them their rule. The expedition gave practical proof of our power, and enlightened their ignorance of the character and nature of the British Government. Among other benefits derived from it, Maung Gyi, Hat Mone and other leaders of a strong dacoit gang, that had given trouble near Wimdwin and against whom two regular expeditions had to be sent, submitted when the Yatsauk Sawba was driven out. The fact being, that the Sawba himself had encouraged and supported them, and his territory had always been a safe asylum for them, when the bordering Burma district in which they were dacoiting became for the moment too hot to hold them, or when after having been dispersed by an expedition, they required time to pull themselves together.

Two districts remain to be subdued in the southern states. The Tran-Salween and the Independent Karenni. The only difficulty about the Tran-Salween states is the distance, and the amount of transport that would consequently be required by troops, who cannot live in the country. A strong company of Burmese military police, composed of Goorkhas, could march up to the Chinese frontier, and would suffice, provided there is no question as to this Chinese frontier, and that the Chinese advanced no unheard of claims. If Kyang Hung, the centre of the district, were occupied for six months, by such a party, it would give our officers time to learn the lay of the country, for the inhabitants to make themselves acquainted with us, and get over any possible fear they may have of our occupation. It is highly probable that opposition to us, is in a great measure due to fear of us, and this fear of us, to ignorance of us, and it is well to remember that "who goes quietly goes far."

As for the independent Karennees or Red Karens, the ruler of Solapore or Solarporegyi, as he is sometimes called will apparently have to be wheeled into line shortly. This is a most difficult country and contains many forests. He is consequently very rich and very hard to get at. An utter savage, and very ignorant, Siam, Burma and England seem to him on a par with himself, very little if anything inferior in power or dignity. To the East he is a thorn in the sides of the Siamese, and on the W. he has, to say the least of it, treated us with scant respect, or rather great disrespect. When General Prendergast took Mandalay, according to the Bombay Burma trading corporation, they had 200 elephants at Pinyaung between Fort Stedman and Burma. These got carried off by different people, and Solarporegyi has a good share of them. Yet he takes no notice of letters asking for their return, and never came in to see the Political officer with the southern Shan column, that made a tour in his neighbourhood in December 1887, and actually passed through part of his territory. Till this state of affairs is altered, we shall not be able to exact the proper respect due to us from the Shans, his immediate neighbours on whom his bad example must have an evil effect. This is only a matter of time and leisure. On the whole it is a matter of gratification and surprise, that so little difficulty has been experienced in the Shan states, compared to that undergone in Burma. The former opinion of the superior warlike qualities of the Shans, being very erroneous; just as much as was the too small opinion held of the Burmese, who considering their arms and organisation, shewed on many occasions pluck and endurance.

The Shan country explored by the troops stationed at Fort Stedman is not a healthy one. Here and there plateaux are to be found enjoying fine bracing climates, but the valleys generally are feverish. The Terai is very malarious, three out of four Englishmen passing through from June to November, suffered more or less from fever, and sepoys fared little better. It is a rich country, but thinly inhabited. It is difficult to say how many times over the soil could support the present population. A few years rest from the ceaseless turmoil and disturbance to which the country has been subjected for years and years, consequent on its peculiar political constitution, should work wonders. The hills are too high and too many for cart roads to be thought of at present, but decent paths, instead of the mere tracks now used, would do a good deal. The inhabitants too have scruples at present about selling animals for slaughter, or even for milking. When they have got over this, it will be more comfortable. For the time being sepoys are in a bad way. Cows are got with difficulty, milk is not to be got without keeping them. Goats have not been introduced, nor sheep, and fowls are a rupee each and more, which is beyond a sepoy's means. There are a few potatoes, but not enough even for the supply of four or five officers; of potatoes in a couple of years there should be an ample supply, and when other vegetables have been introdueed, there will be a better and more varied food supply, and dysentery and diarrhœa should die out, as well as the weakness induced by a hard and dull life, far from home, and an unchanging diet of commissariat rations.

THE RUSSIAN CAVALRY IN 1888.

COMPILED BY SUB-CONDUCTOR J. J. KÖNIGS, B. U. L.

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Introduction.

No branch of the service has undergone such change as the Russian Cavalry in late years. The reorganization is due to the experience gained during the Russo-Turkish war, in which the Cavalry played rather a conspicuous *rôle*, although they had very little opportunity for displaying cavalry attacks, as the enemy's cavalry were no match for them, and the nature of the country at the seat of war was unfavourable.

The manner in which the Russian cavalry acted in battle is better shown by the number of rounds expended by them.

Whilst only 47 rounds of ammunition were expended per rifle by 23 Infantry Divisions, the Dragoons expended 51 (!), and the Hussars and Lancers 46 (!) rounds per carbine. According to the above, it would appear that the cavalry in this instance acted more like infantry than cavalry.

The chief feature of the reorganization of the Russian cavalry is their conversion into dragoons armed with rifle and bayonet, which consequently renders them more adapted to fight on foot than Lancers and Hussars, and may to a great extent be attributed to the great favour in which Dragoons have been held in Russia since the time of the Emperor Nicholas I.

The whole of the Lancer and Hussar regiments of the line have been converted into Dragoons, and will wear the same uniform and equipment. Twenty eight new regiments of Dragoons have been formed in addition to 18 old regiments of Dragoons. The Cavalry of the line now therefore consists of 46 regiments of Dragoons. All armed with the rifle.

These 46 regiments of Dragoons may be considered as so many Infantry Regiments mounted. The rifle is equal in length and weight to that of the infantry.

The musketry instruction for the cavalry is very nearly the same as that of the infantry. The rules for the extended order are very nearly the same in both these branches of the service. The regulations in regard to fighting on foot, as well in offensive as defensive warfare, and for intrenching, are the same on all points as those of the infantry.

Organization.

The Russian cavalry may be divided into the Regular Cavalry and the Cossacks.

Regular Cavalry.

The regular cavalry is composed of the cavalry of the Guard and the cavalry of the Line.

The Cavalry of the Guard comprises 10 regiments, *viz*:—

Cavalry of the Guard.

4	Regiments of	Cuirassiers.
1	ditto	Horse Grenadiers (Dragoons.)
1	ditto	Dragoons.
2	ditto	Lancers.
2	ditto	Hussars.
Total 10	Regiments.	

Cavalry of the Line.

The Cavalry of the Line comprises 46 regiments, all dragoons.

Thus the total number of regiments in the Regular Cavalry is 56, of which 48 are Dragoons. Of these latter there are two regiments in the Cavalry of the Guard.

The regiments of the Guard have titles only, the Dragoon regiments of the Line being known by numbers and by titles, and in most cases by the name of their Honorary Colonel also. The Russian Cavalry is organized in peace and in war, into 20 Divisions, into the composition of which Cossack regiments enter.—*viz:*

Guard Cavalry divisions	2
Line Cavalry divisions	14
Cavalry of the Caucasus	3
Division of Don Cossacks	1
Total	20

The regiments of Cuirassiers have 4, all the others 6, squadrons, each squadron being divided into 4 sections and composed, in peace and war, of the following number of mounted non-commissioned officers, men, and troop horses (combatant.)

1	Squadron Sergeant-Major (Vakhmister.)
4	Senior Sergeants (Starshaji-Unter-Ofitsyer.)
7	Junior Sergeants (Mladshyi Unter-Ofitsyer.)
3	Trumpeters (Trubatch) (4 in the Guard Cuirassiers.)
8	Lance Corporals (Yefreitor.)
120	Privates.
143	Troop-horses.

considered that 10 lascar pals for the men of the 27th P. I. alone, meant 80 coolies, then reserve ammunition 80 more, and so on with everything else, rum kegs and tea cases, bakery, butchery &c.

The start was fixed for the 15th March. Regimental money belonging to the 27th P. I. was to be used as treasure. On the 14th the bullocks turned up, and were loaded. It was still a matter of some anxiety whether the 450 coolies would arrive, as arranged, next morning. Although the Sawba of Myaungwye had promised to supply the coolies, it was suspected that he was not anxious for the success of the new expedition. He was afraid that we might settle our station, the garrison and the Political officer at Mone, and that he would be deprived of any prestige, and all pecuniary advantages which he derived from our being settled in his territory. It is probable he intrigued against the start; and that coupled with the withdrawal of the wing of the Hampshire and whole of the Ghoorkha regiments, to take whose place only 300 of the 27th P. I. had come up, caused the confederation to hesitate, and on the evening of the 14th, a few hours before the settled starting time, Mr. Hildebrand received communication, asking him to delay moving, while the chiefs met and had another consultation, and came to some decision.

It was disappointing, but this expedition had at once to be postponed. If for no other reason, it was quite impossible to move, unless the chiefs had assisted with bullocks and coolies. Those obtained at Myaungwye would not have gone outside that territory for more than one or two marches. If any active hostilities had taken place, they would all probably have bolted and left the column in great straits. But besides this, even if no hostilities had arisen, the chiefs would merely have avoided the Political officers, and nothing would have resulted.

After this the Political officers went on addressing letters, while the chiefs of the confederation continued shilly shallying. They were afraid to molest us, afraid of ourselves and of what our intentions might be, and could not bring themselves at once to right about, give up the Limbin, and what they might consider the national cause, and to which they had bound themselves by solemn declarations and oaths. The Sawba of Yatsauk was particularly hostile, and this hostility proceeded, not from any motives of reasoning but from sheer personal hatred of the English.

Encouraged by our inactivity, he began to give trouble. The capital Yatsauk 30 miles to one flank of our line of communication was a source of danger to us. There was at the time no store of rations at Fort Stedman, and as it was expected that on account of the heavy rains, no communication could be kept up with Burma, after about the 15th May, it was of vital importance to keep the road open for the Shan bullock drivers, who were bringing up the stores. The latter began to consider the road too dangerous. Our posts were 20 and 30 miles apart and it would have been impossible to keep up a sufficient patrolling, to make it perfectly safe, there being only fifty men in each post. Petty dacoities in the district became frequent, a gathering of dacoits was reported four miles on one flank of the road, about half way to Hemedet, *The peace and war establishments of a Regiment are as follows.*—(Continued.)

	4 Squadron Regiment.		6 Squadron Regiment.	
	War.	Peace.	War.	Peace.
Brought forward Total Combatants ...	629	700	920	1,009
(*b*) Volunteers ...	...	4	..	18
(*c*) Non-Combatants ...	...	...	...	...
Regimental Clerk...	1	1	1	1
Senior " ...	3	4	4	5
Junior " ...	...	4	...	5
Dressers.... Senior ...	1	1	1	1
Junior ...	1	1	1	1
Squadron ...	4	4	6	6
Apothecary ...	1	1	1	1
Veterinary Dressers.... Senior ...	1	1	1	1
Junior ...	3	3	3	3
Dresser Pupils ...	...	2	..	2
Veterinary Dresser Pupils ...	...	3	...	3
Hospital Sergeant ...	...	1	...	1
" Orderlies ...	...	2	...	2
Sacristan ...	1	1	1	1
Armourer ...	..	1	...	1
Armourer Assistants ...	2	2	2	2
Farriers. Regimental ...	1	1	1	1
Squadron ...	...	4	...	6
Saddler-Sergeant ...	...	1	...	1
Saddlers and Saddle-tree makers ...	...	5	...	6
Cutter and Fitter...	...	2	...	1
Tailors ...	...	20	...	6
Total Non-Combatants ..	19	65	22	56
Regimental Transport Drivers ...	39	4	48	6
Grand total Non-Combatants ...	58	69	70	62
Total N. C. Officers and men (including Volunteers),	687	769	990	1,071
HORSES.				
Officers—For the Field Officers ...	...	...	2	2
Squadron Commanders ...	...	...	6	6
Section Commanders ...	...	...	24	24
Regimental Adjutant ...	...	...	1	1
Orderly Officer...	...	...	1	1
Total ...	..	...	34	34
Surgeons and Chaplain ...	4	...	4	...
Troop Horses ...	612	577	902	859
Total ...	616	577	949	893
Transport Horses ...	69	8	85	12

The Regimental Commander in a Guard Regiment is a Major-General; in a line Regiment a Colonel. The Junior Field Officers are Colonels in the Guard; Lieutenant-Colonels in the Line. One of the latter assists the Commanding Officer in disciplinary and drill matters, the other in administrative affairs. Of the remaining officers, 6 are Staff Captains in the Cuirassiers; 7 in the other Regiments, while the remainder are Lieutenants and Cornets. One of them acts as Riding Master. Of the two Staff Captains maintained for depôt purposes in each Regiment, one is always attached on command to the corresponding section of a Cavalry depôt cadre. Each Guard Cavalry Regiment has among its classed officials a Band Instructor.

In the four Guard Cuirassier Regiments, and in the 2nd and 37th Dragoon Regiments a Kettle Drummer takes the place of one of the trumpeters, and in each squadron one private is supposed to be trained and equipped as a trumpeter, in addition to those on the establishment. Of the Lance Corporals and Privates, one man per section (*i. e.*, 24 in a 6 squadron, and 16 in a 4 squadron Regiment) is trained and equipped as a shoeing-smith.

Of the 133 (112)* dismounted privates, 6 (4) are trumpeters 6 (4) shoeing-smith pupils, 18 permanent orderlies, 6 orderly room messengers, 24 (16) officers' grooms, 7 (5) cooks, 14 (12) bakers, and 25 (47) officers' servants. On mobilization 60 (48) of those men go to fill up the ranks; the cooks and bakers become transport drivers, and the rest remain as servants in the officers' families.

The rough riders, extra clerks, dresser pupils, armourer sergeants, artificers, fitters, and cutters are transferred to the corresponding section of a Cavalry Depôt Cadre, and the tailors and squadron farriers become regimental transport drivers. The Guard Regiments have in peace 2 cutters and fitters and 20 tailors; but only 9 of the latter become transport drivers in war. The Hospital Sergeant and orderlies are attached in war to the Field Medical establishments.

The 46 (41) dismounted men in a mobilized regiment are all officers' servants, at the rate of 2 for the Regimental Commander, one each for the other officers and officials, and 5 for Divisional and Brigade staff officers.

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* The figures within brackets refer to 4 squadron regiments.

In war dismounted men and non-combatants are carried as follows :—

	4 Squadron Regiment	6 Squadron Regiment.
ON THE TRANSPORT CARRIAGES.		
Regimental Quarter-master Sergeants...	2	2
Clerks	4	5
Dressers	3	3
Senior Veterinary Dresser.	1	1
Armourer Assistants	2	2
Regimental Farrier	1	1
Officers' Servants...	3	4
Total... ...	16	18
ON THE HORSES.		
Squadron Dressers..	4	6
Veterinary Dressers	3	3
Total... ...	7	9

The following are mounted in war on the extra horses obtained by means of the horse conscription :—

	4 Squadron Regiment.	6 Squadron Regiment.
Surgeons and Chaplains	4	4
Squadron Quarter-master Sergeants	4	6
Transport Sergeant	1	1
Officers' Servants leading Officers' horses	30	36
Total... ...	39	47

It will be seen from the above tables that the Russian Cavalry regiments contain a very large proportion both of dismounted combatants and also non-combatants.

This large proportion of dismounted men and Non-Combatants enables the regiments always to appear on parade, and to take the field at their full fighting strength.

The horses of officers of the Guard Regiments being their own property, the 6 squadron regiments of the Guard are weaker than those of the Line by 34 horses in peace, and 38 in war, and number therefore 859 troop horses in peace, and 902 in war.

Term of service.

The ordinary term of service in the Cavalry is fixed at 15 years, 6 with the colours and 9 in the reserve.

An exception is made to this rule in the case of men called upon to serve in corps belonging to the Military Districts of Turkistan, or in those quartered in the provinces of Semirietchia, Yakutsk, and Primorsk. These serve for 13 years, of which 7 are passed with colours and 6 in the reserve.

These terms of service apply only to times of peace; in the event of war, all men remain with the colours as long as their services are required

Men can enlist voluntarily under the following conditions:—

They must be at least seventeen years old, and, if minors, must have the consent of parents or guardians. They must be physically fit, and must have complied with certain educational conditions. Enlisted volunteers are divided into two classes.

1.—For one year if they have passed their examination at a first class educational establishment.

2.—For two years if they have passed the examination according to the special scheme fixed by the Ministers of War and Public Instruction.

On completion of their term of service, volunteers may either pass into the reserve, in which they remain ten years, or may continue in active service with a view to becoming officers.

Volunteers may enter the service at any time of the year. Volunteers joining the cavalry must maintain themselves at their own expense.

The following standard was fixed on for the allotment of the annual contingent in 1879.

Guard Cavalry, height 5 ft. $6\frac{1}{2}$ in. picked men.

Line Cavalry, height 5 ft. $4\frac{3}{4}$ in. not over 5 ft. 10 in.; build suitable for horsemen. Short-legged, bow-legged, or knock-kneed men not to be taken.

The minimum chest measurement is half the height *plus* $\frac{7}{8}$ inches; but a margin of $\frac{21}{32}$ inch is allowed for men otherwise physically fit. There is no standard weight.

Conscripts not fit for combatants to be posted to corps or establishments as non-combatants.

A Russian Cavalry Brigade consists of two regiments. The staff of a Cavalry Brigade is composed of;—

Major General Commanding..	1
Brigade Major	1
Clerk	1

Their baggage is carried in the wagons of one of the Infantry regiments.

A Russian Cavalry Division consists of 2 Brigades, *i.e.*, of 4 regiments. The staff of a Cavalry Division comprises:—

Lieutenant-General Commanding	1
Chief of the Staff, Colonel or Lieut-Colonel..	1
Officers of the General Staff...	2
Divisional Surgeons	1
Clerks ...	6
Transport Drivers...	6
Transport Horses ...	13

The transport consists of 6 two-horse wagons (1884 pattern.)

Two horse batteries, of 6 guns each, are added to a Russian cavalry division. The Russian horse artillery is mentioned in this chapter of cavalry, because, it is attached to the cavalry in peace.

The proportion of cavalry to infantry in the Russian army is less than in the other chief European armies. Taking the number of the infantry, according to Russian calculations, at 1½ million bayonets, the proportion is 1 to 15. In the following armies the proportion is as follows :—

German and French	1 to 11
Austrian..	1 to 9

Cavalry Ersatz, or Depôt.—Corresponding to each regular cavalry regiment is a section of a depôt Cadre. These sections are grouped together into Cadres in such a manner that the number borne by the Cadre is the same as that of the Cavalry Division which it feeds, and the Cadres are again formed into brigades. These cadres have a double duty—in peace to train remounts for their cavalry regiments; in war, in addition to form depôt squadrons from which losses in the field are made good.

A good deal of rain fell about this time: on one day they had to halt, and the wet tents and slippery roads gave trouble.

On arrival at Mone the Sawba did not immediately come and call on the Political Officer, his excuse was illness, but he was more probably holding out, on an exaggerated notion of his importance, and hoped Mr. Scott might come to him first. Seeing there was no chance of this, he came on the second day. The Limbin's plea of sickness was accepted, and he was called on. Dr. Manden the Medical Officer with the party, found him suffering more from anxiety than anything else. Perhaps it was as well that only such a small party had come, otherwise he might have have bolted. As it was he was reassured, and finding that his game in the Shan States was played out, all that he now attempted, was to secure the best terms he could. He was at this time lodged in separate bamboo buildings, a short distance from the residence of the Sawba, the whole of whose buildings were also of bamboo. The Prince had a following of 40 or 50, but though many had left him, he kept up the mockery of a royal court. All natives coming into his presence, grovelled on the ground on their stomachs, with clasped hands, and he had some royal appurtenances, such as gold dahs, peacock feather fans &c.

The first thing he stipulated for was being held free from any accusation, for anything that he might have committed whilst in lower Burma. He evidently mistrusted us, and imagined the Government might rake up some former misdemeanour, apart from anything he had done in the Shan States, and on the strength of this, disallow the pension agreed on, perhaps even imprison him. This and his life was promised. He also tried hard for an increase to the 250 rupees a month, which Government had considered sufficient for all his wants. This however could not be done. To shew how distrustful the Limbin was, it may be mentioned that he asked for the signature, not of Mr. Scott only, but of all the officers with the party, four in all. Everything was done to humour him as from the position the party was in, as regards men and transport, rough measures had if possible to be avoided. As long as he was at Mone he was allowed perfect freedom, the only alternative was making him a close prisoner, which would have been risky. Half measures would have been useless, and might have caused him to take fright and bolt. Everything was settled for an immediate return to Fort Stedman, as rations tied one down to time It was intended to march the troops by a southern road, passing through Mokmi, an important town 25 miles S. of Mone, the head town of a rich and flourishing territory. The Sawba of Mokmi had held aloof from the confederation. The Limbin was much excited when this was proposed to him, as he greatly objected to these people seeing him, and triumphing over him in this misfortune. A direct return was agreed on. The Sawba of Mokmi had already made preparations to receive the troops. He might have been hurt at the apparent neglect of our officers, in not also calling on, and receiving him. It was too far to move the 50 rifles in the time remaining, also it was thought better to remain near to the Limbin, but Mr. Scott, Captain Wallace and Lieut. Jackson of the Survey Department rode over, met with a most friendly and honourable reception, and were able to get back to Mone on the 31st day

Each Cavalry Depôt Brigade has a staff consisting of:—

1. Major-General; | 1. Adjutant. | 2. Clerks. | 1. Armourer.

The Caucasus Cadre is directly under the Commander of the Caucasian Cavalry Division.

The peace strength of each Cadre is as follows:—

		Cadre with 4 Sections.	Cadre with 3 Sections.
OFFICERS.			
Commander (Colonel or Lieut.-Colonel) ...		1	1
Captain, 4 or 3 ... Staff Captain 4 or 3 Lieutenants 2 ...	Commanding Sections ...	4	3
	Assistants to ,, ...	4	3
	Adjutant ...	1	1
	Pay and Quarter-Master ...	1	1
Remount Officer ...		1	1
Total Officers ...		12	10
CLASSED OFFICERS.			
Surgeon ...		1	1
Veterinary Surgeon ...		1	1
Total Officials ...		2	2
NON-COMMISSIONED OFFICERS AND MEN.			
(*a*) COMBATANTS			
Sergeant Majors ...		4	3
Quarter-Master Sergeants ...		4	3
Sergeants ...	Senior ...	4	3
	Junior ...	20	15
Sergeants for Remount Duties	Senior ..	1	1
	Junior ...	3	2
Trumpeters ...		4	3
Lance Carporals...	Guards ...	20	18
	Line ...	24	18
Privates	Guards...	208	183
	Line ...	252	189
Privates with Remount Parties ...		12	12
Total Combatants...	Guards ...	234	243
	Line ...	332	249
(*b*) NON-COMBATANTS.			
Clerks		6	5
Dressers ...		5	4
Veterinary Dressers		4	3
Shoeing Smiths ...		12	9
Saddlers and Saddletree-makers ...		8	6
Tailors		4	3
Hospital Orderlies ...		2	2
Transport Drivers ...		4	3
Total Non-Combatants ...		45	35
Total Non-Commissioned Officers and Men..	Guards ...	329	278
	Line... ...	377	284

HORSES.		In 1 Section.	In 3 Sections.	In 4 Sections.
RIDING.				
Cadre Horses		8 (6)*	24	32 (24)
Remount Horses for Regiments	Guard	86 (58)	258	(232)
	Line	90	270	360
TRANSPORT.				
Draught		1	3	4

Up to the rank of Captain the officers of the Depôt Cadres are on the same list for promotion as those of the regiment from which they came, beyond that rank they are on the general list of the cavalry. The men are recruited in the same manner as in other corps, care being taken that none but men accustomed to horses are placed in the Cadres.

Remounts for the Guard Cavalry are purchased by special officers detailed from each regiment, those for the Line Cavalry by one officer from every two Depôt Cadre Sections. Cavalry remounts are united every year at the Depôt Cadre corresponding to their regiment, and are there passed by a committee consisting of,—for the Guard, the two commanders of the Guard Cavalry Divisions and other members nominated by the commander of the Guard Corps and the Inspector General of Cavalry; and for the whole of the Cavalry of the Line in European Russia, by two committees, each composed of one of the General officers attached for special duty to the Inspector General of Cavalry, one General from an active Cavalry Division, and the General commanding the Depôt Brigade to which the remounts belong. A special Committee passes the horses of the Caucasus Cavalry Division. The horses remain one year at the depôt and are there broken in, being sent to the regiment at the end of the year.

In peace the commander of each Cadre is bound to keep always ready, and corrected up to date, a plan for the formation of two depôt Squadrons for each regiment corresponding to the sections of his Cadre, and is held responsible that each person is acquainted with the place and duties which will be assigned to him. For this purpose lists of the Reserve officers and men to be called in are kept by each Cadre.

On mobilization each section receives from the corresponding Cavalry Regiment two Staff Captains (one already with the Cadre), two rough-riders, the combatant non-commissioned officers and men left behind by the Regiment, two clerks, five dresser pupils, one saddler, one armourer, and one cutter and fitter. These are sent at once to the depôt with all their papers etc., by the shortest route. Each section then proceeds, on the arrival of the reserve men and the horses obtained by the conscription, to form two depôt squadrons of 20 files in the section, retaining at the same time 135 combatant and 45 non-combatant non-commissioned officers and men to form a third squadron if required, and to hasten the making up of uniforms etc.

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* Figures in brackets apply to Cuirassiers only.

Each of the depôt squadrons thus formed would have the following strength :—

Officers.

Squadron Commander, Staff Captain...	1
Subalterns	4
Total ...	5

Non-Commissioned Officers and Men.

(*a*) Combatants.

Sergeant-Major		1
Sergeants	Section	4
	Junior	7
Trumpeters...		3
Lance Corporals and Privates		165
	Total Combatants ...	180

(*b*) Non-Combatants.

Clerks 2, dresser 1, veterinary dresser 1	4
Saddler 1, shoeing-smith 4, cook 1	6
Transport driver...	1
Total Non-Combatants...	11

Horses.

For replacement of officers' horses	11
For Officers of marching squadron	5
For N. C. officers and men, combatant	175
Spare	20
Transport	2
Total horses...	213

The 135 dismounted non-combatants retained at the depôt would include 12 sergeants, 3 trumpeters, and 120 privates, all from the reserve; the 45 non-combatants include those received from the Regiment, except the 2 clerks, and a further number of 37 men from the reserve, of whom 6 are shoeing smiths, 9 tailors, 18 bootmakers, 1 cook, 2 bakers, and 1 transport driver (who looks after 3 transport horses.)

The expansion of each section is shown by the following table.

	Officers.	Non-commissioned officers & men.		Horses.
		Combatants.	Non-combatants.	
Strength of section in peace	2	83	14	99
Received from regiment on mobilization ...	2	2(2)	10	...
Total ...	4	85	24	99
There are required—				
To form 2 depôt squadrons	10	360	22	416
To form the 3rd squadron	5(?)	135	45	0
Total ...	15	495	67	416
There are, therefore, required from the reserve of each regiment	11	410	43	317

The first care of the commanders of squadrons is to form in each a marching detachment of not fewer than 96 mounted men, with the fittest and best horses, which can be sent after the regiment as soon after the 15th day of mobilization as possible, without awaiting the complete formation of the depôt squadrons. On the departure of the first marching detachment another is at once prepared and so on. Full equipment, uniforms, arms, and saddlery for 96 men and horses in each section, are always kept in store by that section, but the war stores for the rest of the Cadre are kept in the Artillery and Intendance depôt. Detachments are sent off as required by the Regiment, upon the order of the War Minister, either as marching detachments as above, or as whole squadrons.

The mounting of Cavalry:—The supply of horses for the Cavalry may be divided into remounting or the ordinary means of making good deficiencies in time of peace, and requisitioning as carried out on mobilization.

Remounts for the Guard Cavalry are purchased by special officers detailed from each regiment; those for the Line Cavalry by one Officer from every two Depôt Cadre sections.

The money for the purchase of remounts is issued on the 1st September of each year, and is calculated as follows, per horse:—

Guard Cuirassiers	£ 30.
Other Guard Cavalry	£ 18 to £ 20.
Horses for Line Cavalry	£ 12.

The above sums cover all expenses of purchase and keep of the horses until their arrival at the Regiment for which they are destined. For marching expenses, 8*s*. are allowed for each Guard, and 4*s*. for each Line remount.

In the Guard the horses of each regiment must be of the same colour. In the Cuirassiers, the Gentlemen of the Guard are mounted on light bay, the Horse Guard on black, the Emperor's Cuirassiers on dark bay, and the Empress's on chesnut horses. In the Dragoons of the Guard, the Horse Grenadiers are mounted on black, and the Guard Dragoons on bay horses. In the Lancers, the Guard Lancers are mounted on Chesnut, and the Emperor's Lancers on brown horses. In the Hussars, the Guard Hussars are mounted on grey, and the Grodno Hussars on brown horses.

In the Line no special colour is laid down for each Regiment, but they are classed by squadrons.

The height of the horses must be as follows:—

	Height.	Age.	
	Hds. in. Hds. in.		
Cuirassiers	15·1 to 16	4 to 7	With a margin of 1 in. in height for exceptionally well-shaped animals.
Light Cavalry of Guard	14·3 to 15·1	4 to 7	
Cavalry of Line ...	14·2 to 15·1	3 to 6	

All remounts join their regiments between the 15th September and 15th October.

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(1) As the rate of exchange varies constantly, all money &c. is here given at 10 roubles to the £ sterling.

Horses are cast annually by a committee consisting of the Regimental, Brigade and Divisional Commanders. The period of service for a horse is 10 years, hence 10 per cent, may be cast. All horses who have served 12 years are first cast, then those unfit for service, then the oldest, until 10 per cent. have been cast. Cast horses are sold by a board of 3 officers, and the money at once returned to the Treasury.

Horses must have at least 56 or 70 inches, of standing room in stables, and the depth of all stalls must be at least 9 ft. 4 inches, with a gangway in rear 2 ft. 4 in. wide. Stable orderlies are always kept in stables. Morning stables are at 5·0 A. M. in summer and 6·0 in winter, midday stables after drill, and evening stables at 6·0 P. M. The oats are divided into three equal feeds. Hay is given in two feeds of 1 to 2 lbs. each after morning and midday stables, and the rest after evening stables.

Forage is issued every 10 or 15 days. The only daily ration during peace is as follows.

	Oats.		Hay.		Straw.	
	lbs.	oz.	lbs.	oz.	lbs.	oz,
Guard Cavalry	12	$7\frac{3}{10}$	9	1	3	10.
Line Cavalry	9	5½	9	1	3	10.
Transport Draught	7	$12\frac{11}{20}$	18	2	......	

In Regiments of the Guard this allowance is made all the year round, but in other Corps it is only issued for 11 months, the horses being turned out to grass, and only receiving 13 lbs. 9½ oz. of hay for one month after the manœuvres, If necessary, barley may be substituted for oats, weight for weight; and hay for oats, in the proportion of 4 lbs. 8½ oz. of hay for 3 lbs. 1⅘ oz. of oats. In war, the above rations are issued with, in addition, 3 lbs. 10 oz. of oats, and in the place of straw, 4 lbs. 8½ oz. of hay. Thus, the forage ration of a Line Cavalry Troop Horse is 12 lbs. 15½ oz. of oats and 13 lbs. 9½ oz. of hay.

Horses are shod at least once in six weeks; they are left unshod for the month they are out at grass.

In winter all horses not required for riding-drill &c., are exercised in blankets for an hour every morning: and once a week all through winter and spring, regardless of the condition of the roads, route marches are carried out by sections, by squadrons, or by whole regiments of between 6⅔ and 10 miles, at a pace of ⅔ mile at a walk and 1⅓ at a trot, finishing up with 2 miles at a trot and ⅔ mile at a walk.

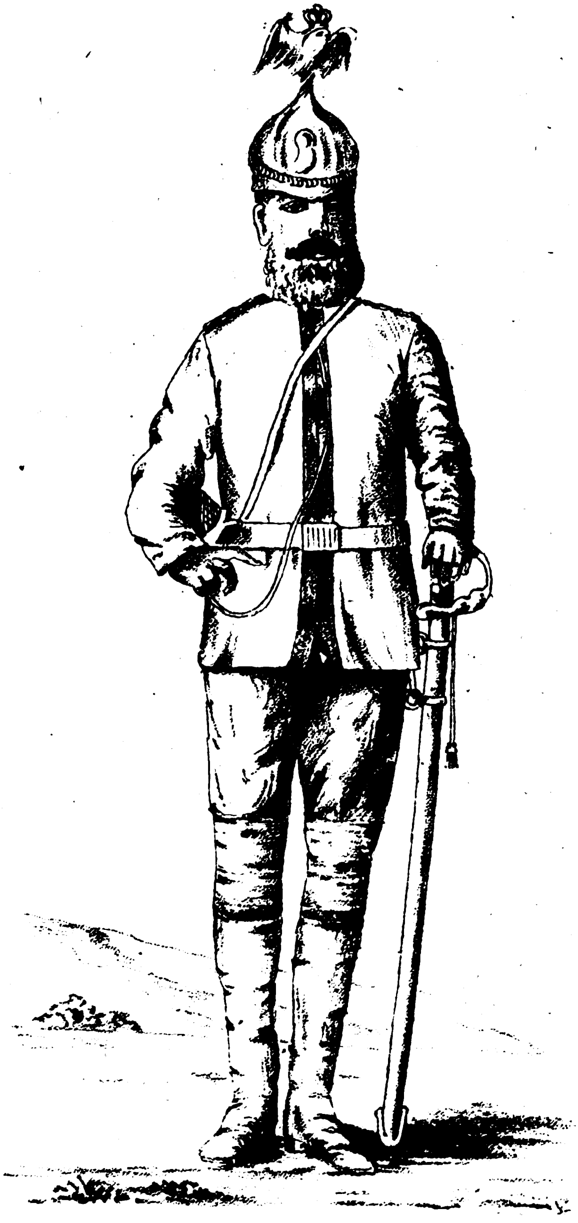
The horses of officers of the Guard are all their own property. In the Line, Officers Commanding Squadrons, Adjutants, and all Subalterns, have each one Government horse, which is treated like any other troop horse, and which they cannot ride except on duty.

Officers entitled to horses of their own, either in addition to that supplied by Government or as their charger or chargers, have the right of purchasing a horse out of the ranks once in five years, if their horses have become unfit for service through no fault of their own. An Officer may choose any horse except that of the Troop Sergeant-Major, who rides on the right flank of the Squadron. The officer is only charged the remount price of the horse plus £ 2.

If the officer has no means of paying for the horse he may borrow the money from the Officers' Remount Fund; which is established in

The peace and war establishments of a Regiment are as follows.

	4 Squadron Regiment.		6 Squadron Regiment.	
	War.	Peace.	War.	Peace.
OFFICERS.				
Regimental Commander	1	1	1	1
Field Officers	2	2	2	2
Squadron Commanders, Captains	4	4	6	6
Regimental Adjutant	1	1	1	1
Pay-Master and Quarter-Master	1	1	1	1
Arms Officer	1	1	1	1
Regimental Judge Advocate	1	1	1	1
Subalterns	19	19	23	23
Total	30	30	36	36
Staff-Captains for the formation of Depot Squadrons	...	2	...	2
Total Officers	30	32	36	38
CLASSED OFFICIALS.				
Senior Surgeon	1	1	1	1
Junior ,,	1	1	1	1
Veterinary ,,	1	1	1	1
Accountant	1	1	1	1
Chaplain	1	1	1	1
Total	5	5	5	5
NON-COMMISSIONED OFFICERS AND MEN.				
(*a*) COMBATANTS				
Mounted.				
Squadron Sergeant-Majors	4	4	6	6
Sergeants { Section	16	16	24	24
Sergeants { Junior	28	28	42	42
Regimental Trumpeter	1	1	1	1
Trumpeters	16	16	18	18
Lance Corporals	32	32	48	48
Privates	480	480	720	720
Total mounted Combatants	577	577	859	859
Dismounted.				
Roughriders	...	...	...	2
Quarter-Master-Sergeants (1 for pay, 1 for quarters, etc., 4 or 6 for squadrons)	6	6	8	8
Sergeants (including 1 for transport)	5	5	7	7
Privates	41	112	46	133
Total dismounted	52	123	61	150
Total Combatants	629	700	920	1,009



CUIRASSIER.

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every Regiment depôt cadre, and to which are paid the £ 2 mentioned above. This fund is first started by a Government donation of £ 120 for each Cavalry Regiment, and it also has the benefit of the money allowed for forage for officer's chargers not kept by their owners, (all officers receive forage for their horses all the year round·) The money borrowed must be repaid within three years, the percentage charged being 1d. in 2 shillings. If the fund exceeds £ 150, poor officers who have distinguished themselves may be presented with horses if they have lost their chargers through no fault of their own, in which case the £ 2 extra need not be paid by the fund.

A horse thus purchased by an officer becomes his own property, but if he sells it he has to provide himself with another horse within two months, but he cannot sell his horse as long as he owes money to the remount fund.

Each officer is required to provide himself on mobilization with a second or third charger and receives an allowance for this purpose.

In war the number of forage rations is increased, and officers also draw a daily allowance of money. The daily allowance consists of a certain number of portions, according to rank, the portion being the same for all ranks, and amounting to about 1-4d. The number of riding and draught horses (not provided for in transport regulations) for which forage is allowed to be drawn by officers in war is:

	Riding.	Draught.
Commander of a Cavalry Division	4	4
Commander of a Cavalry Brigade	3	4
Commander of a Cavalry Regiment	3	...
Junior Field Officer of a Cavalry Regiment ...	3	...
Cavalry Officers of other ranks	2	...

Uniform.—The Dress of the Russian Army was, until lately, very similar to that of the German Army, and displayed a great many outward distinctions, but in the last few year the uniform has undergone a complete change.

In compliance with the Imperial Order, dated 14th November 1881, an universal national uniform for the entire army, with the exception of the Guards, Hussars, Lancers, was introduced.

Cuirassiers.—The uniform of the Cuirassiers consists of—

Tunic.—For full dress, white cloth, single breasted and hooked in front, with piping and shoulder straps of distinctive colour. The distinctive colours are as follows :—

Gentlemen of the Guard Horse Guards	} Scarlet.
Emperor's Cuirassiers	... Yellow.
Empress's Cuirassiers	... Light blue.

The buttons and guard-lace on the collars and cuffs are yellow in the Gentlemen of the Guard, and Emperor's Cuirassiers, white in the other two regiments.

For undress or active service, dark green cloth, single breasted and buttoned with buttons stamped with the Imperial Eagle with similar piping and shoulder straps.

Cuirass.—The cuirass is of iron, covered with a thin layer of copper, and weighing about 30 lbs. This is not worn on active service. When on duty in the Palace an imitation cuirass of scarlet cloth richly embroidered is worn.

Overalls.—The overalls for full dress, are of dark blue cloth with double red stripe.

Pantaloons.—The pantaloons for undress or active service, are of grey blue cloth with piping of the colour of the facings, and are worn with knee boots, and for duty in the Palace white breeches with high jackboots.

Helmet.—The helmet is of iron, covered with a thin layer of copper and coming well down over the nape of the neck. It has ordinarily, a spike, but on state occasions this is replaced by a double-headed Eagle of copper.

Forage cap.—The forage cap worn in undress, is flat and of white cloth without peak and with a band and piping of the colour of the facings.

Great-coat and hood.—The great-coat is of grey cloth, fastening with hooks, with camel's hair hood, which can be removed. There is a patch of coloured cloth on the collar, and the shoulder straps are of the same colour as those of the tunic. In winter a sheepskin coat, reaching to the knees, is worn under the greatcoat.

Boots,—The boots for active service and undress are long, reaching to the knee, with heel spurs. For palace duty, jack-boots are worn.

Gloves.—For full dress, white gauntlets, for undress, white leather gloves.

Dragoons of the Guard.—The uniform of the Dragoons of the Guard consists of :—

Tunic.—The tunic is of dark green cloth, double-breasted, with scarlet piping and white buttons and guard-lace in the Horse Grenadiers, yellow in the Guard Dragoons. The cuffs and collars are scarlet, the former being pointed. Shoulder straps scarlet.

Overalls.—The overalls for full dress, are dark green with two broad scarlet stripes.

Pantaloons.—The pantaloons for undress and active service, are of blue-grey cloth without stripe, and worn inside knee boots with heel spurs.

Head-dress.—The head-dress of the Horse Grenadiers consists of a peculiar leather helmet with a comb of bear's skin passing over it from ear to ear and a long scarlet busby bag hanging down behind, for full dress parade. Both regiments wear on ordinary occasions an Astrakhan fur cap with scarlet top, the fur forming a V. in front and showing the cloth, on which is the star of St. Andrew.

Girdles.—The girdles are dark green with scarlet stripes for both regiments.

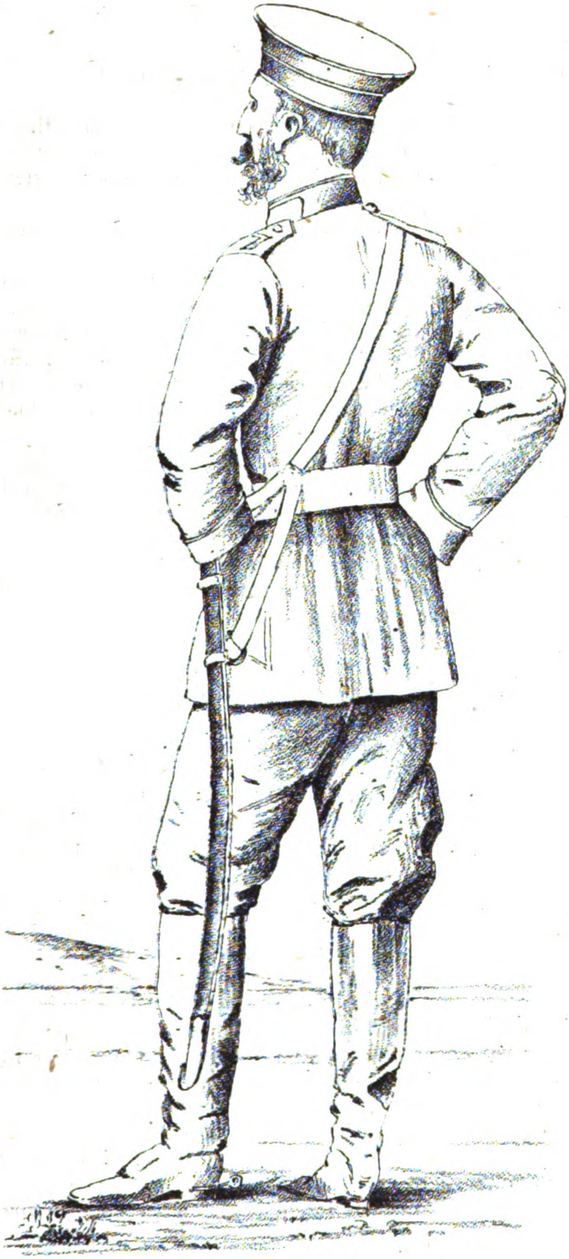
Forage-cap.—The forage-cap is of green cloth with scarlet band for undress and active service.

Great coat and hood.—As in the Cuirassiers.

Gloves.—On parade, white woollen.

Lancers.—The uniform of the Lancers consists of :—

Tunic.—The tunic is of dark blue cloth with scarlet turn backs, collars, and pointed cuffs. The buttons and lace are yellow in the Guard Lancers, white in the Emperor's Lancers. Yellow metal shoulder-scales



DRAGOON OF THE LINE.

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Two horse batteries, of 6 guns each, are added to a Russian cavalry division. The Russian horse artillery is mentioned in this chapter on cavalry, because it is attached to the cavalry in peace.

The proportion of cavalry to infantry in the Russian army is [illegible] than in the other chief European armies. Taking the number of the infantry, according to Russian calculations, at 1½ millions, in this case the proportion is 1 to 15. In the following armies the proportion is as follows:—

German and French ... ... 1 to 11
Austrian .. .. 1 to 9

Cavalry Ersatz, or Depôt.—Corresponding to each regular cavalry regiment is a section of a depôt Cadre. These sections are grouped together into Cadres in such a manner that the number of sections in a Cadre is the same as that of the Cavalry Division which it feeds, and Cadres are again formed into brigades. These cadres have a [illegible] duty—in peace to train remounts for their cavalry regiments, [illegible] in addition to form depôt squadrons from which losses in the field are made good.

The following table shows the distribution of the cadres and regiments to which they correspond:—

Cavalry Depot Brigade.	Cadre.	Section.	Station.	Corresponding Regiment.
Guard Headquarters, Tver	1st Guard.	1st	Staritsa (Govt. of Tver)	Gentlemen of the Guard.
		2nd		Horse Guards.
		3rd		Emperor's Cuirassiers.
		4th		Empress's Cuirassiers.
	2nd Guard.	1st	Biejetsk (Govt. of Tver)	Horse Grenadiers.
		2nd		Guard Lancers.
		3rd		Guard Hussars.
	3rd Guard.	1st	Torjok (Govt. of Tver)	Guard Dragoons.
		2nd		Emperor's Lancers.
		3rd		Grodno Hussars.
1st Headquarters, Riazan	1st	1st	Skopin (Govt. of Riazan) ..	1st Dragoons.
		2nd	Skopin (Govt. of Riazan) ...	2nd do.
		3rd	Grigorievskoe (Govt. of Riazan)	3rd do.
	2nd	1st	Riajsk (Govt. of Riazan) ...	4th do.
		2nd	Mikhailovsk (Govt. of Riazan)	5th do.
		3rd	Spassk (Govt. of Riazan) ...	6th do.
2nd Headquarters, Ostrogojsk	3rd	1st	Novaya Sotnia (Govt. of Voronej	7th do.
		2nd	Korotoyak ditto	8th do.
		3rd	Ostrogojsk ditto	9th do.
	4th	1st	Novaya Sotnia ditto	10th do.
		2nd	Koroteyak ditto	11th do.
		3rd	Novaya Sotnia ditto	12th do.
3rd Headquarters, Biriatch	5th	1st	Birintch ditto	13th do.
		2nd	Veseloe ditto	14th do.
		3rd	Nikitovka ditto	15th do.
	6th	1st	Alexyevevka ditto	16th do.
		2nd	Livensk ditto	17th do.
		3rd	Urazove ditto	18th do.
4th Headquarters, Bobrov.	7th	1st	Bobrov ditto	19th do.
		2nd	Bobrov ditto	20th do.
		3rd	Buturlinovka ditto	21st do.
	8th	1st	Korshevo ditto	22nd do.
		2nd	Koylovka ditto	23rd do.
		3rd	Buturlinovka ditto	24th do.
5th Headquarters, Pavlovsk.	9th	1st	Vorontsovka ditto	25th do.
		2nd	Bielogorye ditto	26th do.
		3rd	Petrovka ditto	27th do.
	10th	1st	Alexandrovka ditto	28th do.
		2nd	Losyevo ditto	29th do.
		3rd	Potapovka ditto	30th do.
6th Headquarters, Bogutchar.	11th	1st	Kalatch ditto	31st do.
		2nd	Mielovaya ditto	32nd do.
		3rd	Tverdokhlyebovo ditto	33rd do.
	12th	1st	Shiryayevo ditto	34th do.
		2nd	Petropaviovka ditto	35th do.
		3rd	Taly ditto	36th do.
7th Headquarters, Zolotonosha.	13th	1st	Zolotonosha (Govt. of Poltava)	37th do.
		2nd	Bogodukhovka ditto	38th do.
		3rd	Tchernobai ditto	39th do.
	14th	1st	Pereiaslavl ditto	40th do.
		2nd	Yagotin ditto	41st do.
		3rd	Pereiaslavl ditto	42nd do.
	Caucasus H. D. Q. Stavropal	1st	Bieloglinskoe (Stavropol Dist.)	43rd do.
		2nd	Novopokrovskaya (Kuban do.)	44th do.
		3rd	Uspenskaya ditto	45th do.
		4th	Ilinskaya ditto	46th do.

Each Cavalry Depôt Brigade has a staff consisting of:—

1 Major-General; 1 Adjutant; 2 Clerks; 1 [illegible]

The Caucasus Cadre is directly under the Commander of the Caucasus Cavalry Division.

The peace strength of each Cadre is as follows:—

	[illegible]	[illegible]
OFFICERS.		
Commander (Colonel or Lieut.-Colonel)	1	[illegible]
Captains 4 or 3 — Commanding Squadrons	4	[illegible]
Staff-Captains 4 or 3 — Assistants to [illegible]	4	[illegible]
Lieutenants 2 — Adjutant	1	[illegible]
Pay and Quarter Master	1	[illegible]
Lieutenant Officer	1	[illegible]
Total Officers	[illegible]	[illegible]
CLASSED OFFICERS.		
Surgeon	1	1
Veterinary Surgeon	1	[illegible]
Total Officers	2	[illegible]
NON-COMMISSIONED OFFICERS AND MEN.		
(a) COMBATANTS.		
Sergeant-Majors	4	1
Quarter-Master Sergeants	4	1
Sergeants — Senior	4	[illegible]
Sergeants — Junior	[illegible]	[illegible]
Sergeants for Regimental Duties — Senior	1	[illegible]
Sergeants for Regimental Duties — Junior	[illegible]	[illegible]
Trumpeters	4	[illegible]
Lance-Corporals — [illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
Privates	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
Total Combatants	[illegible]	[illegible]
(b) NON-COMBATANTS.		
[illegible]	4	1
[illegible]	[illegible]	[illegible]
[illegible]	4	1
[illegible]	[illegible]	[illegible]
[illegible]	4	[illegible]
[illegible]	4	1
[illegible]	[illegible]	[illegible]
[illegible]	4	1
Total Non-Combatants	[illegible]	[illegible]
Total Non-Commissioned Officers and Men	[illegible]	[illegible]

HORSES.		In 1 Section.	In 3 Sections.	In 4 Sections.
RIDING.				
Cadre Horses		8 (6)*	24	32 (24)
Remount Horses for Regiments	Guard	86 (58)	258	(232)
	Line	90	270	360
TRANSPORT.				
Draught		1	3	4

Up to the rank of Captain the officers of the Depôt Cadres are on the same list for promotion as those of the regiment from which they came, beyond that rank they are on the general list of the cavalry. The men are recruited in the same manner as in other corps, care being taken that none but men accustomed to horses are placed in the Cadres.

Remounts for the Guard Cavalry are purchased by special officers detailed from each regiment, those for the Line Cavalry by one officer from every two Depôt Cadre Sections. Cavalry remounts are united every year at the Depôt Cadre corresponding to their regiment, and are there passed by a committee consisting of,—for the Guard, the two commanders of the Guard Cavalry Divisions and other members nominated by the commander of the Guard Corps and the Inspector General of Cavalry; and for the whole of the Cavalry of the Line in European Russia, by two committees, each composed of one of the General officers attached for special duty to the Inspector General of Cavalry, one General from an active Cavalry Division, and the General commanding the Depôt Brigade to which the remounts belong. A special Committee passes the horses of the Caucasus Cavalry Division. The horses remain one year at the depôt and are there broken in, being sent to the regiment at the end of the year.

In peace the commander of each Cadre is bound to keep always ready, and corrected up to date, a plan for the formation of two depôt Squadrons for each regiment corresponding to the sections of his Cadre, and is held responsible that each person is acquainted with the place and duties which will be assigned to him. For this purpose lists of the Reserve officers and men to be called in are kept by each Cadre.

On mobilization each section receives from the corresponding Cavalry Regiment two Staff Captains (one already with the Cadre), two rough-riders, the combatant non-commissioned officers and men left behind by the Regiment, two clerks, five dresser pupils, one saddler, one armourer, and one cutter and fitter. These are sent at once to the depôt with all their papers etc., by the shortest route. Each section then proceeds, on the arrival of the reserve men and the horses obtained by the conscription, to form two depôt squadrons of 20 files in the section, retaining at the same time 135 combatant and 45 non-combatant non-commissioned officers and men to form a third squadron if required, and to hasten the making up of uniforms etc.

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* Figures in brackets apply to Cuirassiers only.

Each of the depot squadrons thus formed would have [illegible] strength :—

Officers.

Squadron Commander, Staff Captain	1
Subalterns	4
Total ...	5

Non-Commissioned Officers and Men.

(a) Combatants.

Sergeant Major	1
Sergeants { Section	4
Sergeants } Junior	7
Trumpeters	3
Lance Corporals and Privates	165
Total Combatants ...	180

(b) Non-Combatants.

Clerks 2, dresser 1, veterinary dresser 1	4
Saddler 1, shoeing smith 4, cook 1	6
Transport driver...	1
Total Non-Combatants ...	11

Horses.

For replacement of officers' horses	11
For Officers of marching squadron	5
For N.-C. officers and men, combatant	175
Spare	[illegible]
Transport	2
Total Horses ...	[illegible]

The 165 [illegible] non-commissioned [illegible] retained at the [illegible] 12 [illegible], 3 trumpeters, and 112 [illegible] privates, [illegible] 4 [illegible] the 2 [illegible] 9 [illegible] 18 [illegible] 1 [illegible], 2 [illegible] 3 transport horses.

[illegible]

The first care of the commanders of squadrons is to form in each a marching detachment of not fewer than 96 mounted men, with the fittest and best horses, which can be sent after the regiment as soon after the 15th day of mobilization as possible, without awaiting the complete formation of the depôt squadrons. On the departure of the first marching detachment another is at once prepared and so on. Full equipment, uniforms, arms, and saddlery for 96 men and horses in each section, are always kept in store by that section, but the war stores for the rest of the Cadre are kept in the Artillery and Intendance depôt. Detachments are sent off as required by the Regiment, upon the order of the War Minister, either as marching detachments as above, or as whole squadrons.

The mounting of Cavalry :—The supply of horses for the Cavalry may be divided into remounting or the ordinary means of making good deficiencies in time of peace, and requisitioning as carried out on mobilization.

Remounts for the Guard Cavalry are purchased by special officers detailed from each regiment ; those for the Line Cavalry by one Officer from every two Depôt Cadre sections.

The money for the purchase of remounts is issued on the 1st September of each year, and is calculated as follows, per horse :—

Guard Cuirassiers	£ 30.
Other Guard Cavalry	£ 18 to £ 20.
Horses for Line Cavalry	£ 12.

The above sums cover all expenses of purchase and keep of the horses until their arrival at the Regiment for which they are destined. For marching expenses, 8*s.* are allowed for each Guard, and 4*s.* for each Line remount.

In the Guard the horses of each regiment must be of the same colour. In the Cuirassiers, the Gentlemen of the Guard are mounted on light bay, the Horse Guard on black, the Emperor's Cuirassiers on dark bay, and the Empress's on chesnut horses. In the Dragoons of the Guard, the Horse Grenadiers are mounted on black, and the Guard Dragoons on bay horses. In the Lancers, the Guard Lancers are mounted on Chesnut, and the Emperor's Lancers on brown horses. In the Hussars, the Guard Hussars are mounted on grey, and the Grodno Hussars on brown horses.

In the Line no special colour is laid down for each Regiment, but they are classed by squadrons.

The height of the horses must be as follows :—

	Height. Hds. in. Hds. in.	Age.	
Cuirassiers	15·1 to 16	4 to 7	With a margin of 1 in. in height for exceptionally well-shaped animals.
Light Cavalry of Guard	14·3 to 15·1	4 to 7	
Cavalry of Line ...	14·2 to 15·1	3 to 6	

All remounts join their regiments between the 15th September and 15th October.

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(1) As the rate of exchange varies constantly, all money &c. is here given at 10 roubles to the £ sterling.

Horses are cast annually by a committee consisting of [illegible] Brigade and [illegible] Commanders. The period of [illegible] is 10 years, hence 10 per cent. may be cast. All horses [illegible] 12 years are first cast, then those unfit for [illegible] 10 per cent. have been cast. Cast horses are sold by auction, and the money at once returned to the treasury.

Horses must have at least 56 or 70 [illegible] stables, and the depth of [illegible] must be at least 9 ft. [illegible] gangway in rear 2 ft. [illegible] wide. Stables [illegible] are [illegible] stables. Morning stables are at 5.0 a.m. [illegible] midday stables after dinner, and evening stables at 6 p.m. [illegible] divided into three rations. Hay is given in two [illegible] each after morning and midday stables, and the rest [illegible]

Forage is issued every 10 or 15 days. The [illegible] of peace is as follows.

	Oats	Hay	Straw
	lbs.	[illegible]	[illegible]
Guard Cavalry	12 7	9 1	[illegible]
Line Cavalry	9 5	9 1	4 [illegible]
Transport Draught	7 12	18 2	[illegible]

In R[illegible] [illegible] Guard [illegible] but in the [illegible] [illegible] and [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]

Hor[illegible] [illegible]

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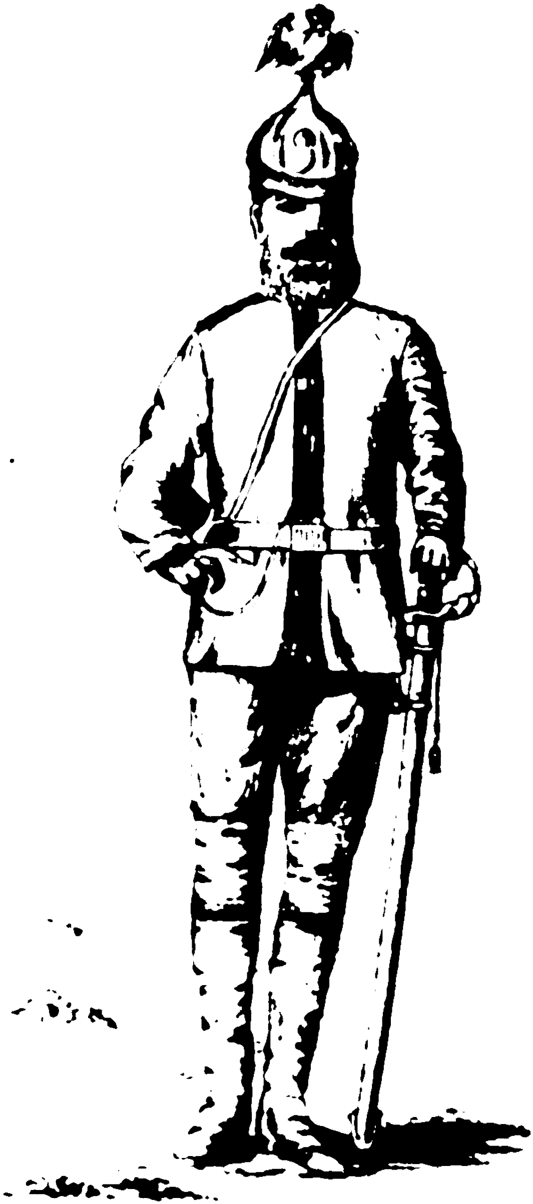

CUIRASSIER

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every Regiment depôt cadre, and to which are paid the £ 2 mentioned above. This fund is first started by a Government donation of £ 120 for each Cavalry Regiment, and it also has the benefit of the money allowed for forage for officer's chargers not kept by their owners, (all officers receive forage for their horses all the year round.) The money borrowed must be repaid within three years, the percentage charged being 1d. in 2 shillings. If the fund exceeds £ 150, poor officers who have distinguished themselves may be presented with horses if they have lost their chargers through no fault of their own, in which case the £ 2 extra need not be paid by the fund.

A horse thus purchased by an officer becomes his own property, but if he sells it he has to provide himself with another horse within two months, but he cannot sell his horse as long as he owes money to the remount fund.

Each officer is required to provide himself on mobilization with a second or third charger and receives an allowance for this purpose.

In war the number of forage rations is increased, and officers also draw a daily allowance of money. The daily allowance consists of a certain number of portions, according to rank, the portion being the same for all ranks, and amounting to about 1-4d. The number of riding and draught horses (not provided for in transport regulations) for which forage is allowed to be drawn by officers in war is :

	Riding.	Draught.
Commander of a Cavalry Division ...	... 4	4
Commander of a Cavalry Brigade ...	... 3	4
Commander of a Cavalry Regiment ...	... 3	...
Junior Field Officer of a Cavalry Regiment	... 3	...
Cavalry Officers of other ranks ...	... 2	...

Uniform.—The Dress of the Russian Army was, until lately, very similar to that of the German Army, and displayed a great many outward distinctions, but in the last few year the uniform has undergone a complete change.

In compliance with the Imperial Order, dated 14th November 1881, an universal national uniform for the entire army, with the exception of the Guards, Hussars, Lancers, was introduced.

Cuirassiers.—The uniform of the Cuirassiers consists of—

Tunic.—For full dress, white cloth, single breasted and hooked in front, with piping and shoulder straps of distinctive colour. The distinctive colours are as follows :—

Gentlemen of the Guard Horse Guards	} Scarlet.
Emperor's Cuirassiers	... Yellow.
Empress's Cuirassiers	... Light blue.

The buttons and guard-lace on the collars and cuffs are yellow in the Gentlemen of the Guard, and Emperor's Cuirassiers, white in the other two regiments.

For undress or active service, dark green cloth, single breasted and buttoned with buttons stamped with the Imperial Eagle with similar piping and shoulder straps.

Cuirass.—The cuirass is of iron, covered with a thin layer [illegible] and weighing about 30 lbs. This is not worn on active service [illegible] on duty in the Palace an imitation cuirass of scarlet cloth [illegible] broidered is worn.

Overalls.—The overalls for full dress, are of dark blue [illegible] double red stripes.

Pantaloons.—The pantaloons for undress or active service are [illegible] grey blue cloth with piping of the colour of the facings, and are worn [illegible] knee boots, and for duty in the Palace white breeches with high [illegible]

Helmet.—The helmet is of iron, covered with a thin layer [illegible] and coming well down over the nape of the neck. It has [illegible] spike, but on state occasions this is replaced by a [illegible] of copper.

Forage cap.—The forage cap worn in undress, is flat [illegible] cloth without peak and with a band and piping of the [illegible]

Greatcoat and hood.—The great-coat is of grey cloth, [illegible] hooks, with camel's hair hood, which can be removed. There [illegible] of coloured cloth on the collar, and the shoulder straps are [illegible] colour as those of the tunic. In winter a sheepskin coat, rea[illegible] knees, is worn under the greatcoat.

Boots.—The boots for active service and undress are long, [illegible] to the knee, with heel spurs. For palace duty, jack-boots are worn.

Gloves.—For full dress, white gauntlets, for undress, [illegible] gloves.

Dragoons of the Guard.—The uniform of the Dragoons of the Guard consists of:—

Tunic.—The tunic is of dark green cloth, double-breasted, [illegible] scarlet piping and white buttons and guard-lace in the Horse Grenadiers, yellow in the Guard Dragoons. The cuffs and collars are scarlet, the former being pointed. Shoulder straps scarlet.

Overalls.—The overalls for full dress, are dark green with two [illegible] scarlet stripes.

Pantaloons.—The pantaloons for undress and active service are blue-grey cloth without stripes, and worn inside knee [illegible]

Head-dress.—The head-dress of the Horse Grenadiers [illegible] peculiar leather helmet with a comb of bearskin passing [illegible] ear to ear and a long scarlet horsehair bag hanging down [illegible] dress parade. Both regiments wear on ordinary occasions [illegible] fur cap with scarlet top, the fur forming a V in front [illegible] cloth, on which is the star of St. Andrew.

Girdles.—The girdles are dark green with scarlet stripes for [illegible] regiments.

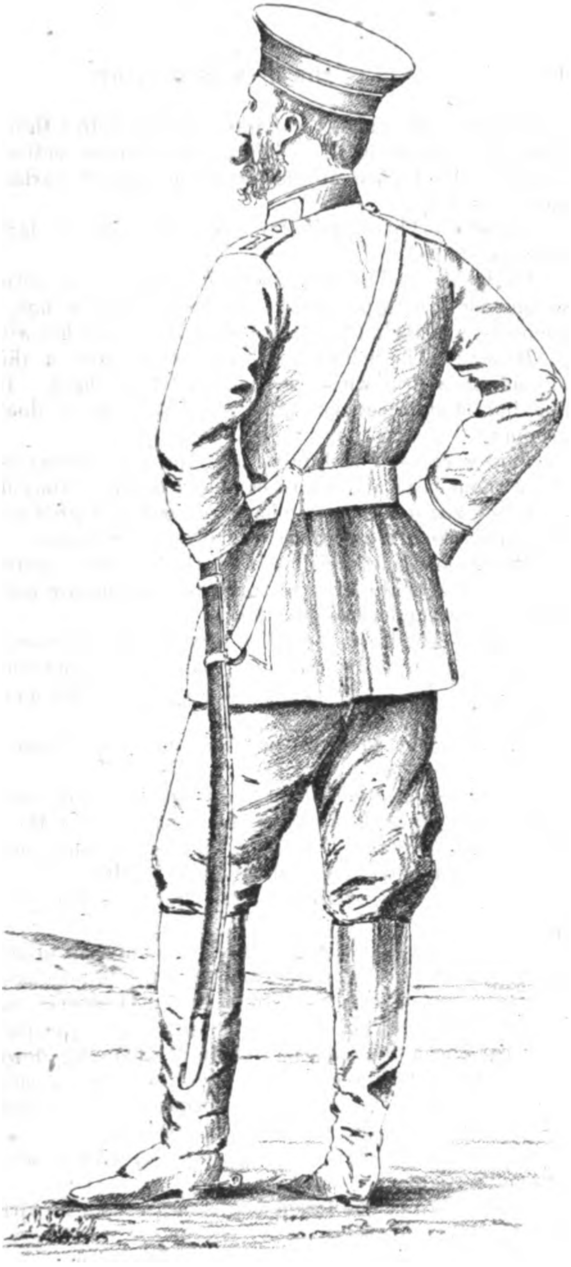
Forage cap.—The forage cap is of green cloth with [illegible] undress and active service.

Great-coat and hood.—As in the Cuirassiers.

Gloves.—For parade, white woollen.

Lancers.—The uniform of the Lancers consists of:—

Tunic.—The tunic is of dark blue cloth with scarlet [illegible] collars, and pointed cuffs. The buttons and lace are yellow [illegible] Lancers, white in the Emperor's Lancers. Yellow [illegible]



DRAGOON OF THE LINE

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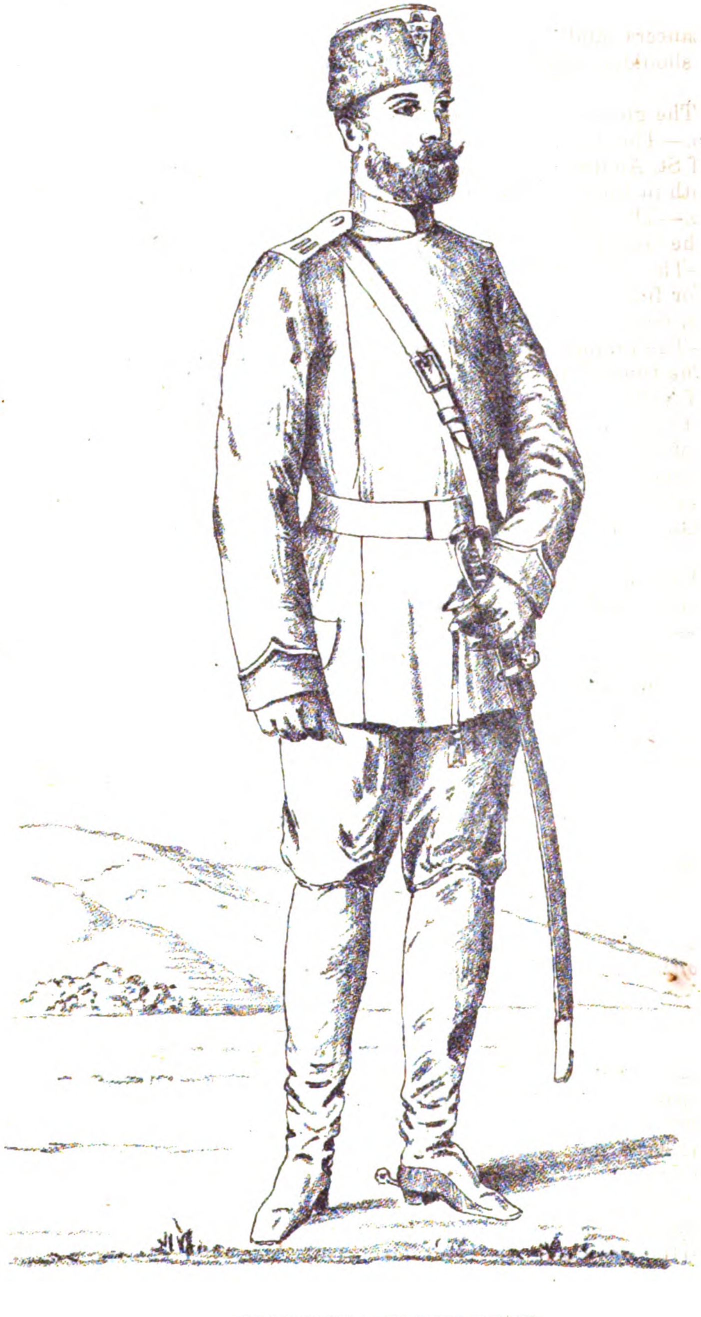

DRAGOON OF THE LINE.

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in the Guard Lancers, and white metal shoulder-scales in the Emperor's Lancers, these shoulder scales are lined with scarlet cloth in both regiments.

Girdles.—The girdles are red with blue stripes.

Head-dress.—The head-dress consists of a black leather lace-cap with the star of St. Andrew, scale chin strap, and the upper part covered with scarlet cloth in the Guard, and yellow in the Emperor's Regiment

Forage-cap.—The forage-cap is of dark blue cloth with red band and piping in the Guard, yellow in the Emperor's Regiment.

Overalls.—The overalls are of dark blue cloth with two broad scarlet stripes for full dress.

Pantaloons, Great-coats, Gloves.—As in the Guard Dragoons.

Hussars.—The uniform of the Hussars of the Guard consists of:—

Tunic.—The tunic of the Guard Hussars is a scarlet Hussar tunic with six rows of yellow lace on the breast, an Austrian knot on the cuffs and lace round the collar and on the seams of the back.

The tunic of the Grodno Hussars is a green hussar tunic with white lace, as in the Guard Hussars.

Pantaloons.—The pantaloons are of dark blue cloth with yellow stripes for the Guard and crimson with white stripe for the Grodno Hussars.

Pelisse.—The Pelisse is of white cloth trimmed with black fur and yellow lace in the Guard, and green with white fur and white lace in the Grodno Hussars.

Head-dress.—The head-dress consists of a busby, with scarlet bag for the Guard, and crimson for the Grodno Hussars, white plume for both.

Girdle.—Red and yellow for the Guard, green and white for the Grodno Hussars.

Forage-cap.—Scarlet with blue band and yellow piping for the Guard Green with crimson band and white piping for the Grodno Hussars.

Boots.—Hessian, with a V. and boss in front, trimmed round the top with yellow lace for the Guard, and white lace for the Grodno Hussars.

Great-coats and Gloves as in the Guard Dragoons.

Dragoons of the Line.—The uniform of the Dragoons of the Line consists of:—

Tunic.—The tunic is of dark green cloth, except in the 36th Regiment, which has brown tunics, double breasted, fastening with hooks, and cut loose so as to permit of a warm waistcoat being worn underneath. The object of the hooks and eyes having been substituted for buttons is to permit of clothing being more rapidly fitted on mobilization. The tunic has a soft stand up collar of coloured cloth, shoulder straps fastening with buttons. The cuff is of the same colour of the tunic, ornamented by a pointed tracing of coloured braid. The shoulder-straps are of various colours, and bear the number of the Regiment. The 35th and 37th Regiments have the cypher of their chiefs on the shoulder strap.

The distinctive colours of the various Regiments are as follows:—

Regiments.	Collar.	Patch on Collar.	Piping on Collar	Piping on Cuff.	Officer's lace and buttons.	Shoulder straps.
1st	Dark Green	Red	Red	Red	Gold	Red.
2nd	Ditto	Madder	Madder	Madder	Do.	Madder.
3rd	Ditto	Rose	Rose	Rose	Do.	Rose.
4th	Ditto	Do	Do.	Do.	Silver	Do.
5th	Ditto	Orange	Orange	Orange	Gold	Orange.
6th	Ditto	Turquoise	Turquoise	Turquoise	Do.	Turquoise.
7th	Ditto	Light Blue	Light Blue	Light Blue	Do.	Light Blue.
8th	White	Dark Green	Dark Green	White	Do.	White.
9th	Dark Green	Lilac	Lilac	Lilac	Do.	Lilac.
10th	Light do.	Dark Green	Dark Green	Light Green	Do.	Light Green.
11th	Orange	Ditto	Ditto	Orange	Silver	Orange.
12th	Dark Green	Brown	Brown	Brown	Gold	Brown.
13th	White	Dark Green	Dark Green	White	Silver	White.
14th	Dark Green	Red	Red	Red	Do.	Red.
15th	Rose	Dark Green	Dark Green	Rose	Do.	Rose.
16th	Dark Green	White	White	White	Do.	White.
17th	Ditto	Madder	Madder	Madder	Do.	Madder.
18th	Ditto	Lilac	Lilac	Lilac	Do	Lilac.
19th	Ditto	Yellow	Yellow	Yellow	Gold	Yellow.
20th	Brown	Dark Green	Dark Green	Brown	Silver	Brown.
21st	Madder	Ditto	Ditto	Madder	Do.	Madder.
22nd	Dark Green	Yellow	Yellow	Yellow	Do.	Yellow.
23rd	Ditto	Brown	Brown	Brown	Do.	Brown.
24th	Yellow	Dark Green	Dark Green	Yellow	Do.	Yellow.
25th	Red	Ditto	Ditto	Red	Gold	Red.

26th	Madder	Dark Green	Dark Green	Madder	Gold	Madder.
27th	Rose	Ditto	Ditto	Rose	Do.	Rose.
28th	Red	Ditto	Ditto	Red	Silver	Red.
29th	Lilac	Ditto	Ditto	Lilac	Gold	Lilac.
30th	Do	Ditto	Ditto	Do	Silver	Do
31st	Light Blue	Ditto	Ditto	Light Blue	Gold	Light Blue.
32nd	Dark Green	White	White	White	Do.	White.
33rd	Brown	Dark Green	Dark Green	Brown	Do.	Brown.
34th	Light Blue	Ditto	Ditto	Light Blue	Silver	Light Blue.
35th	Yellow	Ditto	Ditto	Yellow	Gold	Yellow.
36th	Brown	Yellow	Yellow	Do.	Do.	Do.
37th	Orange	Black	Black	Orange	Do.	Orange.
38th	Dark Green	Light Blue	Light Blue	Light Blue	Silver	Light Blue.
39th	Ditto	Orange	Orange	Orange	Do.	Orange.
40th	Ditto	Light Green	Light Green	Light Green	Gold	Light Green.
41st	Light Green	Dark do.	Dark do.	Ditto	Sivler	Do.
42nd	Dark „	Light do.	Light do.	Ditto	Do.	Do.
43rd	Dark „	Crimson	Crimson	Crimson	Gold	Crimson.
44th	Crimson	Dark Green	Dark Green	Do.	Do.	Do.
45th	Dark Green	Crimson	Crimson	Do.	Silver	Do.
46th	Crimson	Dark Green	Dark Green	Do.	Do.	Do.

The men of the 1st, 4th, 5th, 6th, 8th, 32nd and 46th Dragoons have white lace, the 44th and 45th yellow lace on the collars.

Girdles.—All regiments wear girdles of the same colour as their shoulder-straps.

Pantaloons.—The pantaloons are of blue grey cloth, cut loose and worn always with knee boots with heel spurs.

Head-dress.—The head-dress consists of a cap of black Astrakhan fur with a cloth top, the fur being cut into a V. in front and rear and showing a cloth lining, on the front of which is the Imperial Eagle (the 37th has the star of the order of St. George) in brass or white metal according to the color of the officers' lace and buttons given above, the cockade and the scroll, if any, with honorary distinctions. The cloth is of the colour as the shoulder straps.

Forage-cap.—The forage-cap is of dark green cloth (brown in the 36th) flat-topped with band and piping of the same colour of the shoulder-strap, and no peak.

Great-coat.—As in the Guard, with patch on the collar the same colour as that on the collar of the tunic, and piping the colour of the collar of the tunic.

The uniform of the Cavalry Depôt Cadre is as follows :—

Those of the Guard are clothed as the Guard Dragoons. The collar, cuffs, shoulder straps, and lining of the cap are scarlet, the shoulder straps being marked with the number of the Cadre and G Z., (Gvardnskyi Zapas).

Those of the Line are clothed as the Dragoons of the Line, with red collars with green piping and no patch, red piping on the cuff, shoulder-straps with the number of the Cadre, and Z (Zapas) or K Z (Kavkazski Zapas) for the Caucasian Cadre and red lining to the cap.

The uniform of the Non-combatants is as follows :—

Those of Cuirassiers have only the green tunic, and those of Hussars have no pelisses. Those of Lancers have shoulder-straps instead of scales. The head-dress is the forage cap with peak. Non-combatants have no arms in peace but the universal pattern sword (Shashka.)

The Veterinary Surgeons wear dark-blue uniforms with red piping on the collar and cuffs, blue forage caps with blue band and red piping and silver narrow shoulder-pieces. Trousers grey-blue with red piping.

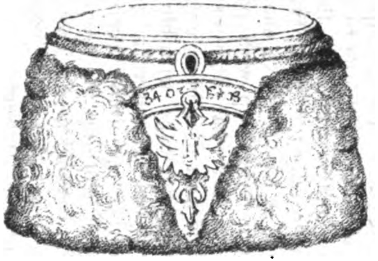
Issue of Clothing.—Recruits on joining receive a complete new kit, and the following articles of clothing are issued annually: 2 shirts, 1 pair of boots, materials for a second pair of boots (*viz* : 1 pair of soles 1 pair of boot-legs, Guards receive two pair of boot-legs), 1 neck-cloth, 2 pair of drawers, 1 pair of summer trousers.

Every other year soldiers receive 1 tunic, 1 pair of cloth trousers. (the Guards receive one pair of cloth trousers every year), and one forage cap.

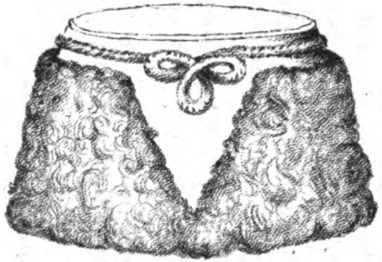
The Recruits receive this issue of clothing at the end of the first year. For their first twelve months' service part worn uniforms are issued to them.

The tunic, trousers, and cap for the first two years after issue are called "of the first term," and are kept in the regimental store, only being worn by the men at reviews and on important occasions.

HEAD DRESS.



Front



Back

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At the end of this term they are handed over to the men, and are worn on guard and at all parades for a second term of two years.

At the expiration of the second term these articles of clothing become the property of the soldier.

In order to keep his in repair, to provide himself with a third shirt, blacking, pipeclay, &c., a small money allowance—3*s.* 6*d.* to 4*s.*, is made annually to each soldier.

The clothing establishments furnish a certain number of uniforms but the greater part of the clothing and boots required for the Regiments is made up in the regimental workshops (these workshops are not available for making up the second pair of boots, which the men must get made elsewhere) from material supplied by the Intendance.

Under certain circumstances, however, commanding officers are granted a money allowance to provide clothing, boots, &c. for the men of their regiments.

Special clothing.—Climatic considerations, on the one hand, and motives of economy on the other, have caused a distinct costume to be adopted for the soldiers serving in Turkistan.

For the greater part of the year the men war a linen blouse with cloth shoulder-straps, chamois-leather trousers dyed red, and a white cap with a flap to shelter the back of the head from the sun's rays. The leather trousers (called *tchambars*) were adopted from the natives; they are durable, cool in summer, and protect the legs from the spear grass.

Personal Equipment.—The equipment adopted for all regular Cavalry in war, without exception, and for Dragoons of the Guard and Line and Lancers in peace, is as follows:

Sword belt.—The sword belt is of buff leather, about 1½ in. broad, passing over the right shoulder and fastening in front with an ordinary tongued buckle. It has two very short slings for the sword, so short that the top of the belt of the sword is on a level with the top of the girdle.

Waist belt.—The waist belt is of buff leather worn over the girdle in marching order, fastening in front with a simple tongued buckle, and supported by a brace passing over the left shoulder. On this brace, and on the belt behind the right-hip, are straps for supporting the carbine case.

Pouches.—The two pouches which are made of buff leather carrying 18 rounds each, one on each side of the buckle of the waist belt, are suspended to the latter by loops, so that they do not shake about.

The belts of all Cavalry of the Guard are of white patent leather. Cuirassiers have only one pouch.

The Cuirassiers and Hussars have waist belts with long slings to wear with their old pattern Cavalry swords in Garrison, the former of white patent leather, and worn over the tunic, the latter of red leather for the Guard, and black for the Grodno Hussars, and worn beneath the tunic. The Hussars have sabretaches.

Officers have as a rule, the same uniform as their men, but have gold or silver lace on the collar and cuffs, where the men have yellow or white. All officers have gold or silver lace on the collars whether the men have it or not. Where the men have black collar patches or cap bands, Officers have the same in black velvet. The ornaments on the shapkas (fur caps) of all Officers are gilt or silver. In marching order with the tunic officers wear a girdle, which is of the same colour as the men's. The sword belt is worn over the right shoulder, and is of the same colour of leather as the men's belts. Shoulder pieces of cloth covered with lace are worn in undress and service marching order. For General Officers the shoulder piece is plain, for Field Officer's it has two longitudinal cloth stripes, for Troop Officers one stripe.

In full dress (parade) Officers wear the full dress head-dress and epaulettes with badges of rank and regimental number &c. For Troop Officers, these have no fringes; for Field Officers, soft fringes; for Generals, stiff thick fringes. Sashes of orange, black, and silver are also worn round the waist by all Officers.

In undress, Officers wear dark green frock-coats, long trousers worn over the boots, generally of dark green cloth with stripes, shoulder pieces, sword in frog, and forage cap. The forage cap of all officers has a peak. Officer's greatcoats are cut closer than those of the men.

Officers are allowed to wear leather trousers in the field.

The stars on the shoulder-straps and epaulettes, denoting rank are as follows:

	General Officers.	*Field Officers.*	*Troop Officers.*
No Star.	General.	Colonel.	Captain.
3 Stars.	Lieut. Colonel.	Lieut. Colonel.	Lieutenant.
2 Stars.	Major-General.	...	Sub-Lieutenant
1 Star.	...	...	Ensign.

Non-Commissioned Officers and men.—Non-Commissioned Officers, Trumpeters &c &c., are clothed as the men, but Sergeant-Majors wear Officers' swords and girdles.

The badges of rank are as follows:—

Lance-Corporal.—One stripe of yellow or white braid across the shoulder-strap.

Junior Sergeant.—Two stripes of yellow or white braid across the shoulder straps, and gold or silver lace on collar and cuffs.

Senior Sergeants.—Three stripes of yellow or white braid across the shoulder-strap and gold or silver lace collar and cuffs.

Sergeant-Major.—One strip of gold or silver braid across the shoulder-strap, and gold or silver lace on collar and cuffs. Volunteers have orange, black, and white cord round their shoulder-straps.

Trumpeters have "wings" similar to those in our army.

Re-engaged men—On re-engagement a silver stripe of lace pointed upwards above the left cuff. After 5 year's re-engaged service, a gold stripe. For 10 years' service, a silver medal to be worn on the left breast. After that period men may receive silver or gold medals to be worn round the neck.

Arms.—The arms of the Russian Cavalry consist of:—

Sword—The universal pattern for all regular Cavalry is the so-called "shashka," a curved sword 3 ft. 4 in. long, and weighing 2 lbs. 11 oz., its guard being formed of a single bar. Its scabbard is of wood covered with leather, and the rings on the convex edge of the scabbard, so that the sword is carried edge to the rear. The Cuirassiers have for garrison duty a straight broad sword, 3 ft. 8 in. long, and weighing

4½ lbs, termed a "palash," with a steel scabbard and the Hussars a lighter sword also with a steel scabbard.

Rifle.—The Berdan dragoon pattern rifle is carried by all combatant mounted men, except the Sergeant Major, Trumpeters, and Transport Sergeants, in a case slung behind the back, muzzle upwards. with the butt behind the right hip, and secured to the shoulder brace and waist belt. The dragoon pattern is similar to the infantry rifle in principle and takes the same cartridge. Its length however, is only 4 feet, and its weight 7 lbs. 6 oz. It is sighted up to 1,200 paces, but orders have been recently issued for Cavalry to be practised up to 1,500 paces.

The total number of dragoon pattern rifles in possession of the troops on 1st January 1883, was 85,186.

Bayonet.—All men armed with rifles have a bayonet carried in a scabbard fixed to the *shashka* scabbard. The length of the carbine and bayonet is 5 ft. 6 in.

Revolver.—The Russian service revolver is the "Smith and Wesson, pattern 3," a hard-hitting and accurate weapon. It has six chambers, and the chambers and barrel are hinged on to the butt. When a spring catch above the breech is released, the barrel and chambers drop forward and throw out the empty cartridges cases. The weight of the pistol is 2 lbs. 6¾ oz.

The calibre of this pistol is 0·420 in; its charge is 23 grains, and the bullet weighs 233·7 grains. The cartridge is central fire and of solid brass, and weighs 321·4 grains.

The revolver is carried in a brown leather case on the waist-belt, which is fitted also to carry six rounds ammunition. The revolver is secured by a cord which passes round the man's neck.

The Sergeant Majors, Trumpeters, and dismounted combatants carry the revolver on all occasions, but transport Sergeants and all non-combatants in war only.

Lances.—The lance is now used in the Russian Cavalry only for parade purposes. With it are armed, on these occasions. the front rank of Cuirassiers and Lancer Regiments. The lance is 9 ft. long, and weighs 6 lbs. 11 oz. The stave is painted scarlet in the Gentlemen of the Guard, dark-blue in the Horse Guards, yellow in the Emperor's, and light blue in the Empress's Cuirassiers, and black for the Guard Lancer Regiments.

The pennons of the Cuirassiers are formed of three traingular portions, of which the central one nearest the shaft is yellow for the Empress's, and white for the other regiments. The other portions are scarlet for the Gentlemen of the Guard, dark-blue and yellow for the Horse Guards, light-blue and yellow for the Emperor's, and light-blue for the Empress's Cuirassiars. The Lancers' pennons are in four bands, white and scarlet alternately.

Horse Appointments.—The new pattern saddlery was introduced by General Order 68 of 28th March 1885.

Bridle and Head Stall.—The bridle consists merely of a bridle-head and chin-band, the bridle head passing through keepers on the brow-band of the head stall. To the end of the bridle-head is hooked (so that it can be easily detached) the bit, which has a moderately high port and rings for the bit reins. The bit is provided with a curb-chain. The head stall is much the same as that in use in the British army, with a T bit, much the same as the pattern formerly in use in the British army, and bridoon-rein. The head-rope is worn round the neck of the horse, the roll of extra rope to have four turns, and to be six inches from the lower ring of head-stall.

Saddle.—The saddle consists of two wooden bars, with two arches of tubular iron. The panels consists of three plies of felt, sewn together at the edges and bound with leather, pockets of which fit over the faces, the rear one being laced on the rear face to keep the panel in position. The seat, which is stretched between the arches and the flaps, are of leather, the latter being fixed to the bars and provided with knee-pads. There are two leather girths, fixed to the bar and united under the belly by a cross-piece about 16 inches long; a breast-plate is also used. The stirrup-leathers are also passed through D's on the bars. Neither crupper nor surcingle is used. Under the saddle is a numdah of leather lined with felt, provided with pockets to fit over the front fans of the bars, straps to buckle over the rear fans, and D's to which the wallets and cloak are fastened. Beneath this numdah, and on the horse's back, is a blanket. Two wallets are strapped to the fore-part of the saddle, and two saddle bags to the rear part of the numdah, the bags being united by a broad strap passing over the seat. All saddlery is left the natural colour of the leather.

Shabraques are only worn in the Guard, and are for Hussars pointed at an acute angle to the rear, for the remainder square cornered. The fore-part is rounded off. Those for Cuirassiers are of the colour of the facings, except in the Horse Guards, where they are dark-blue, embroidered, and ornamented with the star of St. Andrew. The shabraques of the Dragoons and Lancers are dark-green and dark-blue respectively, with scarlet binding and the Emperor's cypher, those of the Guard Hussars are blue with red cord lace, and those of the Grodno Hussars green with white lace. The mode of carrying equipment in marching order in the Russian Cavalry is as follows:—

In front of the saddle are the corn-sack, with its ends pushed into the wallets, the rolled cloak on the top of the sack, and the tent cloth on the top of the cloak, one water bucket of canvas is also carried for every two horses, and each horse carries a picket peg. The hood and water bucket are folded up and placed inside the cloak.

The following is the mode of carrying the kit. In the saddle bags are carried :—

Near bag.

Hay net.
Bag with 2 lbs. $11\frac{1}{2}$ oz, ($1\frac{1}{2}$ days) Biscuit.
Cholera Belt.
Pair of Ear laps.
Bandages.
Bags with $9\frac{3}{5}$ to 12 oz. of Groats, } Rolled up in a square piece of cloth for repair of the Tunic
Bag with $1\frac{4}{5}$ Salt, }
Bag with Tea & Sugar }
Bag with spare parts for rifle, and cleaning materials, rolled up in a piece of cloth for repair of Pantaloons.
Towel, piece of soap, and housewife and comb, rolled up in a piece of linen for repairs.
Pair of baggage straps.
Nose-bag in a pocket.
1 Horse Brush.

Off bag.

Forage Rope.
Tin box of Hoof ointment.
1 Clothes Brush.
1 Grease Brush.
1 Harness Brush.
1 Shirt.
1 Pair Drawers.
1 Pair Ankle boots.
1 Towel.
In a Pocket.
2 Shoes.
16 Nails.
1 Curry comb.

In rear of the saddle, resting on the bars and fastened by three baggage-straps, are the blankets in a cover, with the messtin pulled over the near end of the roll.

Entrenching tools.—The entrenching tools are carried by the Russian Cavalry as follows :—

In each squadron are carried 20 light shovels and 20 axes on the saddles, in leather covers (they are fitted with loops, and may be carried on the waistbelt.)

The following tools and *materiel* are carried in a pair-horsed wagon in the regimental transport.

(*A*).—For destruction of Railways and Telegraphs, per 2 squadrons.

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4 Rope beckets for climbing telegraph poles.
20 Pyroxiline cartridges in cartouches or bags ($14\frac{1}{2}$ oz. each.)
32 Primers.
16 Metal caps for preservation of primers.
$25\frac{3}{4}$ ft. Bickford's fuze.
10 Leather cases for cartridges.
16 Do. do. primers.
2 Do. do. Bickford's fuze.
2 Do. do. detonating tubes.
4 Cutting pliers.
3 Spare [illegible] with [illegible] grains fulminate of mercury in iron box.

50 Detonating tubes, with caps fixed, in copper cases.
4½ ft. Slow match for lighting Bickford's fuze.
8 Match boxes or tinder boxes with flint and steel.
70 ft. Spun yarn for fixing cartridges.
70 ft. Cord for tying together telegraph wires.
70 ft. Wire for entangling telegraph lines.

Total weight per 2 squadrons about 83 lbs.

Pack-saddle (Dietrich's) for carrying the above with appliances, consisting of saddle tree and appurtenances, 46 lbs., 2 leather boxes, 14 ft. pack saddle rope, 7ft spare rope, total 59¼ lbs.

Total weight of instruments and pack-saddle—142¼ lbs. As there are three sets of instruments &c., per Regiment of 6 Squadrons, the total weight per Regiment is 426¾ lbs.

(*B*).—The tools for the Construction of Bridges and Ferries are as follows:—

Per Squadron:—
3 Chisels of various sizes.
2 Large Saws.
1 Small Saw.
1 Cross-cut Saw.
3 Augers (large, medium, and small).
1 Large Hammer.

Total weight per Squadron	24	lbs.
Ditto Regiment of 6 Squadrons	144	,,

(*C*).—Entrenching tools:—

Per Squadron:—

4 Large Steel Spades	18 lbs.	2 oz.
4 Do Axes	14 ,,	8 ,,
Total weight per Squadron	32 lbs.	10 oz.
Ditto Regiment	195¾ ,,	

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240 Slabs of Wet Pyroxiline	121 lbs.
84 Primers	
28 Metal Caps of Primers	
45 Spare Metal Caps for explosive Cartridges	

Re-capitulation of weight per Regiment.

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Total	887¾ lbs.

As above stated, these are conveyed in a pair-horse wagon, but in case of necessity the apparatus (A.) can be placed on the pack-saddles and distributed among the Squadrons. No horses are specially detailed for the purpose, the pack-saddles are placed on the horse.

(*To be continued.*)

Inventions.

IMPROVED LUSHAI DANDY.

BY

DEPUTY SURGEON-GENERAL COLLIS.

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The specification of the improved dandy is as follows :—

The frame is made of good sound male bamboo, and both side and end pieces are doubly ferruled at both ends.

The legs and pole support rings are made of the best Swedish iron.

The pole supports consist of two pairs of male bamboos 3″ circumference, 3′ 4″ long. They are ferruled at the upper ends, and each pair is joined by galvanised iron wire seizing. They are pointed and iron ferruled at lower ends.

The bottom is of sootli, well woven, and can be tightened as required by means of a log line and a light piece of strong male bamboo, to which the lacing is attached.

The sides are strong supported by a malleable iron band, which passes underneath the bottom, and the canvas sling passes through it between the lacing and the iron band, and is suspended to the pole by a hook attached to the centre of the sling.

There is a strong canvas suspender for raising up a man wounded in the chest ; it will also take the place of a pillow ; it is provided with three pieces of log line for adjustment.

The bed is attached to the pole by means of a 1″ circular wire rope, with ends spliced into a heart-shaped cringle. It is to the cringle that the sling and centre log line of the suspender are attached.

The dandy is suspended from the pole by a manacle or compass jointed hook band, which can be fitted to any sized pole, and can be removed without difficulty.

The bamboo top of the dandy is bound together with galvanized wire and attached to the pole by means of strong log line at both ends and centre.

The cover is made of doosootie with best Goorack's grass bleached No. 6 canvas ; this is exactly the same width as the bamboo top. The cover can be laced up at both ends and sides by means of 26 brass eyelet holes and log line.

The cover and pole when removed from the dandy and placed on the pole supports form a small tent for the four bearers.

For this purpose there are two guy ropes of thin galvanized wire, ten small square iron pegs, with rounded necks and a small hammer wrench, to be carried in a canvas bag, which fits in a pocket of the dandy sling.

From the pole a small net is suspended to hold sundries, and two canvas slings to fasten the patient's rifle to the pole if necessary.

The whole of the iron work is made of the best Swedish iron.

The total weight of the dandy is 71¼ lbs.

The actual cost of making up one of these dandies in Calcutta is Rs. 39-2-6.

A sketch of the dandy is appended.

Measurements of Deputy Surgeon-General W. Collis's improved Dandy.

Parts.	Feet.	Inches.
Length of pole	15	...
Height of pole from the ground	2	1
Length of top frame	6	2
„ bottom frame	6	5
Width of top frame	1	7
„ bottom frame	2	5
Length of pole supports	3	4
„ suspender	2	8
Width of suspender	1	9
Height of ends of the sling	1	6
Width of „ „	2	3
Height of legs	...	4½

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Vol. XVIII. 1889. No. LXXVI.

NARRATIVE OF A JOURNEY THROUGH PERSIA *EN ROUTE* TO ENGLAND.

BY

Lieutenant C. J. Markham, *4th Battn. King's Royal Rifle Corps.*

The following narrative is a report of a journey that I, in company with a brother officer, made through Persia last year on our way home from India on leave. Our route was from Karachi to Bushire by steamer and thence to Shiraz, Isfahan, Tehran, Kermanshah and Baghdad. My object was to acquire a colloquial knowledge of Persia and to study Persia and the Persians. From Baghdad we travelled due north to the Black Sea through Asiatic Turkey, but the following account is confined to the Persian part of the journey.

BUSHIRE.

Bushire is the largest town in the Persian Gulf, and is the head-quarters of the British Resident in the Gulf, several mercantile firms, and a large staff of telegraph *employés*. The town is built on the northern extremity of a sandy peninsula, 11 miles long by 4 miles wide in the broadest place. It is surrounded by the sea, except on the south side. Like all Persian cities, it is built of flat-roofed houses, the blank walls forming narrow, unpaved lanes. The *bazars* are small and dirty, and have no architectural pretensions. The heat here during the summer months is very great, the thermometer often registering over 100° Fahrenheit in the shade, and Europeans who live in the town suffer a good deal from fever. For this reason the telegraph staff of the Indo-European line has been moved into quarters 5 miles distant with excellent results.

Climate.

Colonel Ross had been Resident at Bushire for over 16 years, and he was much liked and respected by the Busheris, while his influence extended far and wide throughout the district. The good-will of the Persians may be seen from the fact that several rich men vied with each other in costly decorations and illuminations to celebrate the Jubilee of Her Majesty on February 16th.

that it can be easily detached) the bit, which has a moderately high port and rings for the bit reins. The bit is provided with a curb-chain. The head stall is much the same as that in use in the British army, with a T bit, much the same as the pattern formerly in use in the British army, and bridoon-rein. The head-rope is worn round the neck of the horse, the roll of extra rope to have four turns, and to be six inches from the lower ring of head-stall.

Saddle.—The saddle consists of two wooden bars, with two arches of tubular iron. The panels consists of three plies of felt, sewn together at the edges and bound with leather, pockets of which fit over the faces, the rear one being laced on the rear face to keep the panel in position. The seat, which is stretched between the arches and the flaps, are of leather, the latter being fixed to the bars and provided with knee-pads. There are two leather girths, fixed to the bar and united under the belly by a cross-piece about 16 inches long; a breast-plate is also used. The stirrup-leathers are also passed through D's on the bars. Neither crupper nor surcingle is used. Under the saddle is a numdah of leather lined with felt, provided with pockets to fit over the front fans of the bars, straps to buckle over the rear fans, and D's to which the wallets and cloak are fastened. Beneath this numdah, and on the horse's back, is a blanket. Two wallets are strapped to the fore-part of the saddle, and two saddle bags to the rear part of the numdah, the bags being united by a broad strap passing over the seat. All saddlery is left the natural colour of the leather.

Shabraques are only worn in the Guard, and are for Hussars pointed at an acute angle to the rear, for the remainder square cornered. The fore-part is rounded off. Those for Cuirassiers are of the colour of the facings, except in the Horse Guards, where they are dark-blue, embroidered, and ornamented with the star of St. Andrew. The shabraques of the Dragoons and Lancers are dark-green and dark-blue respectively, with scarlet binding and the Emperor's cypher, those of the Guard Hussars are blue with red cord lace, and those of the Grodno Hussars green with white lace. The mode of carrying equipment in marching order in the Russian Cavalry is as follows :—

In front of the saddle are the corn-sack, with its ends pushed into the wallets, the rolled cloak on the top of the sack, and the tent cloth on the top of the cloak, one water bucket of canvas is also carried for every two horses, and each horse carries a picket peg. The hood and water bucket are folded up and placed inside the cloak.

The following is the mode of carrying the kit. In the saddle bags are carried :—

Near bag.

Hay net.
Bag with 2 lbs. $11\frac{1}{2}$ oz, ($1\frac{1}{2}$ days) Biscuit.
Cholera Belt.
Pair of Ear laps.
Bandages.
Bags with $9\frac{3}{5}$ to 12 oz. of Groats,
Bag with $1\frac{4}{5}$ Salt,
Bag with Tea & Sugar
} Rolled up in a square piece of cloth for repair of the Tunic
Bag with spare parts for rifle, and cleaning materials, rolled up in a piece of cloth for repair of Pantaloons.
Towel, piece of soap, and housewife and comb, rolled up in a piece of linen for repairs.
Pair of baggage straps.
Nose-bag in a pocket.
1 Horse Brush.

Off bag.

Forage Rope.
Tin box of Hoof ointment.
1 Clothes Brush.
1 Grease Brush.
1 Harness Brush.
1 Shirt.
1 Pair Drawers.
1 Pair Ankle boots.
1 Towel.

In a Pocket.

2 Shoes.
16 Nails.
1 Curry comb.

In rear of the saddle, resting on the bars and fastened by three baggage-straps, are the blankets in a cover, with the messtin pulled over the near end of the roll.

Entrenching tools.—The entrenching tools are carried by the Russian Cavalry as follows :—

In each squadron are carried 20 light shovels and 20 axes on the saddles, in leather covers (they are fitted with loops, and may be carried on the waistbelt.)

The following tools and *materiel* are carried in a pair-horsed wagon in the regimental transport.

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1 Auger in case.
1 Claw hammer in case.
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16 Metal caps for preservation of primers.
$25\frac{3}{4}$ ft. Bickford's fuze.
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50 Detonating tubes, with caps fixed, in copper cases.
4½ ft. Slow match for lighting Bickford's fuze.
8 Match boxes or tinder boxes with flint and steel.
70 ft. Spun yarn for fixing cartridges.
70 ft. Cord for tying together telegraph wires.
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Total weight per 2 squadrons about 83 lbs.

Pack saddle (Dietrich's) for carrying the above with appliances, consisting of saddle tree and appurtenances, 46 lbs., 2 leather boxes, 14 ft. pack saddle rope, 7ft spare rope, total 59¼ lbs.

Total weight of instruments and pack-saddle—142¼ lbs. As there are three sets of instruments &c., per Regiment of 6 Squadrons, the total weight per Regiment is 426¾ lbs.

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Per Squadron:—
3 Chisels of various sizes.
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1 Large Hammer.

Total weight per Squadron	24 lbs.
Ditto Regiment of 6 Squadrons	144 „

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Per Squadron:—

4 Large Steel Spades	18 lbs. 2 oz.
4 Do Axes	14 „ 8 „
Total weight per Squadron	32 lbs. 10 oz.
Ditto Regiment	195¾ „

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240 Slabs of Wet Pyroxiline	121 lbs.
84 Primers	
28 Metal Caps of Primers	
45 Spare Metal Caps for explosive Cartridges	

Re-capitulation of weight per Regiment.

(*A*.)	426¾ lbs.
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The pole supports consist of two pairs of male bamboos 3″ circumference, 3′ 4″ long. They are ferruled at the upper ends, and each pair is joined by galvanised iron wire seizing. They are pointed and iron ferruled at lower ends.

The bottom is of sootli, well woven, and can be tightened as required by means of a log line and a light piece of strong male bamboo, to which the lacing is attached.

The sides are strong supported by a malleable iron band, which passes underneath the bottom, and the canvas sling passes through it between the lacing and the iron band, and is suspended to the pole by a hook attached to the centre of the sling.

There is a strong canvas suspender for raising up a man wounded in the chest ; it will also take the place of a pillow ; it is provided with three pieces of log line for adjustment.

The bed is attached to the pole by means of a 1″ circular wire rope, with ends spliced into a heart-shaped cringle. It is to the cringle that the sling and centre log line of the suspender are attached.

The dandy is suspended from the pole by a manacle or compass jointed hook band, which can be fitted to any sized pole, and can be removed without difficulty.

The bamboo top of the dandy is bound together with galvanized wire and attached to the pole by means of strong log line at both ends and centre.

The cover is made of doosootie with best Goorack's grass bleached No. 6 canvas ; this is exactly the same width as the bamboo top. The cover can be laced up at both ends and sides by means of 26 brass eyelet holes and log line.

The cover and pole when removed from the dandy and placed on the pole supports form a small tent for the four bearers.

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[illegible]-General W. Collis's improved Dandy.

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[illegible] bottom frame	2	5
[illegible] pole supports	3	4
[illegible] suspender	2	8
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[illegible] the [illegible] the [illegible]

The whole of the iron work [illegible] of the best [illegible]

The total weight of the [illegible] is 71¼ lbs.

The actual cost of making up one of these [illegible] Rs. [illegible]

A sketch of the dooly is appended.

Measurements of Dooly [illegible] W. C. [illegible]

Parts	Feet	Inches
Length of pole	15	
Height of pole from the ground	2	[illegible]
Length of top frame	6	[illegible]
„ bottom frame	6	[illegible]
Width of top frame	1	[illegible]
„ bottom frame	2	[illegible]
Length of [illegible]	3	[illegible]
„ [illegible]	2	[illegible]
Width of suspender	1	9
Height of [illegible] the [illegible]	1	[illegible]
Width of „ „	2	[illegible]
Height of [illegible]		[illegible]

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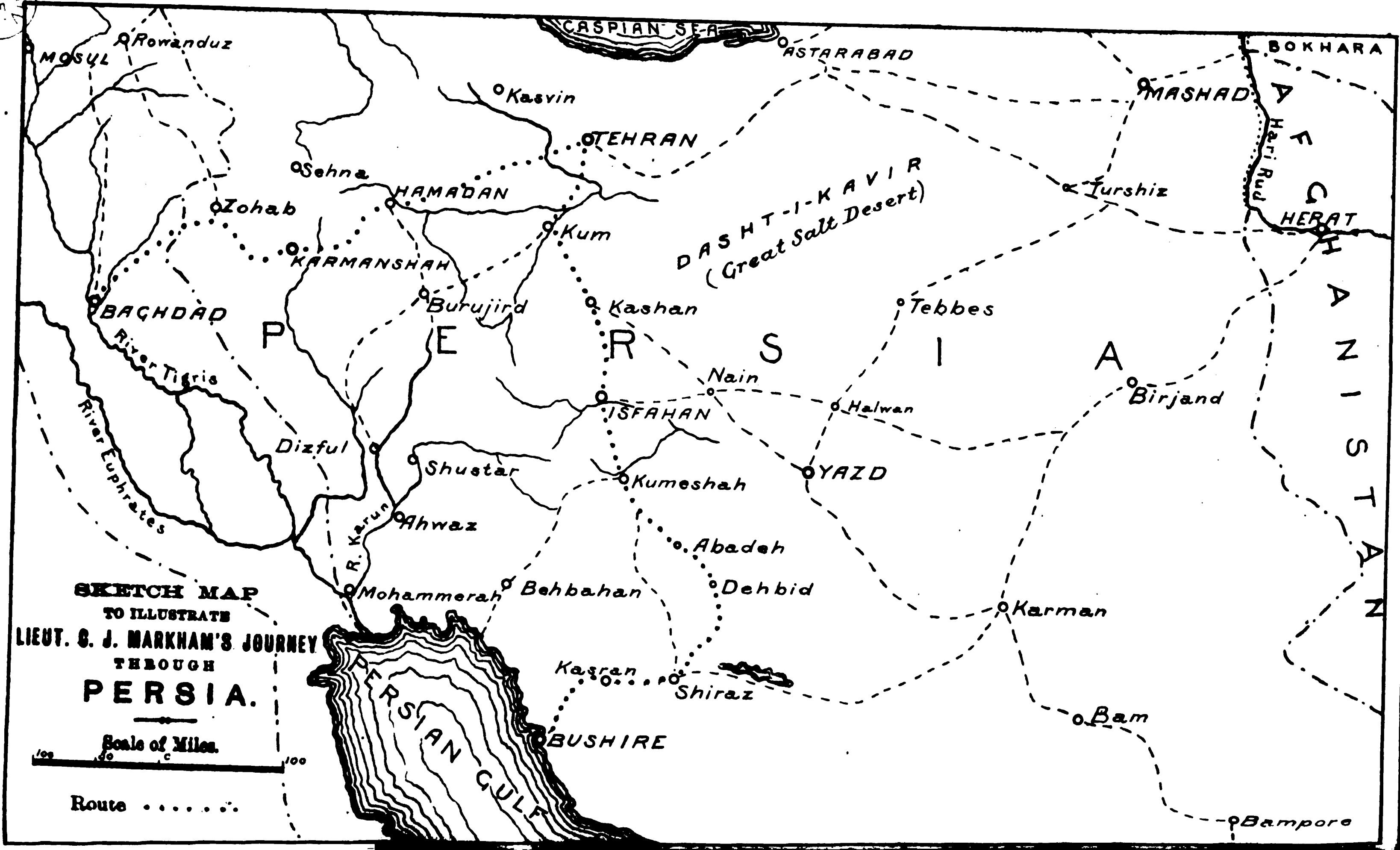

SKETCH MAP
TO ILLUSTRATE
LIEUT. C. J. MARKHAM'S JOURNEY
THROUGH
PERSIA.

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Service of steamers.

A weekly service of steamers of the British India Company running between Bombay and Bussora touches here, and carries the mails and cargo, which is delivered at the various ports—Muscat, Bundar Abbas, Linga, Jask, and Bahrain.

Telegraph.

From Bushire starts the main road of Persia between the Persian Gulf and the Caspian Sea, passing Shiraz, Isfahan, and Tehran. The telegraph line follows it the whole way, and clerks are posted along it at testing stations, varying from 30 to 60 miles apart.

General description of Road.

For the first 56 miles the road traverses the level ground that lies between the foot of the hills and the sea. From the village of Dulukki the ascent from lowland to highland commences, and is made up of four distinct "steps," with level plains lying between them. The "steps" consist of four distinct *kotals* or passes :

(i.)	Kotal-i-Malu	1,800 feet.
(ii.)	Kotal-i-Kamaraj	2,800 „
(iii.)	Kotal-i-Dukhtar	4,500 „
(iv.)	Mian Kotal and Kotal-i-Pir-i-Zan	7,650 „

The last is the highest point between Bushire and Shiraz. In this mountainous country the so-called road is merely a narrow mule track, winding through rocky defiles,up and down torrent beds strewn with boulders, and along precipices. The passes are excessively steep and dangerous, and the path always goes the shortest and steepest way. It goes without saying that this route is impassable for field guns, though a mule battery would have no difficulty. Light cavalry mounted on the clever horses of the country could pass in single file if necessary, though it cannot be said in general terms that the road is practicable for cavalry.

Infantry, of course, would have no difficulty, though they would have to march in many places in single file. Baggage could be easily carried on either camels or mules. Snow falls on the higher passes in December and January ; but traffic is never quite impossible. Once at Shiraz, on the central Asian plateau, difficulties cease. The country is then a vast desert, diversified by low ranges of rocky hills, which present no obstacles that cannot be overcome. Between Tehran and Kermanshah, there is only one difficult march, that between Hamadan and Saidabad, when the lower spurs of Mount Elwend have to be crossed. The pass is long and the ascent gradual on the east side ; but on the west the descent is very steep, and impracticable for field guns. After passing Kermanshah, the road descends from the highlands to the lowlands by a difficult pass. The road for many miles is strewn with large stones so thick as to render any pace but a walk impossible. On reaching the lowlands, the road once more becomes broad and level, and free from obstacles as far as Baghdad.

The telegraph.

The Persian branch of the Indo-European Telegraph system follows the main road from Bushire to the Caspian Sea. There are three wires—one for the usual traffic, one belonging to the Persians, and one in reserve in case of accidents, which occur frequently during the heavy snowstorms of winter. There are testing stations at intervals of from 30 to 60 miles, where telegraph clerks reside, whose duty it is to test the wires five times a day, and to keep them in repair. These men, living amongst the Persians, exercise a considerable influence over them, and are universally respected. They are the men to whom the traveller must look for information about the country and people. (The villagers know nothing, and are not to be relied upon). Their kindness and hospitality to European travellers is proverbial throughout Persia. At Shiraz, Isfahan, and Tehran there are large "transmitting stations," where clerks are on duty night and day.

The Road from Bushire to Shiraz.

From Bushire to Ahmadi, 25 *miles*.—The road crosses a level desert, the first half on a clay soil, which after rain becomes several inches deep in mud; the second half sandy, but light. A few date groves are passed. At Ahmadi is a fine stone karavanserai. Like all serais, it is in the form of a square, enclosing an open yard about 50 by 50 yards. There is one entrance closed by a strong wooden gate. The walls are 15 feet high, and very thick. Inside there runs round the walls a vaulted passage, where mules are lodged at night, and inside of that a row of stone cells on each side, where travellers can shelter. There is a wretched hamlet here. The well water is brackish; the natives collect and drink rain water, which, though discolored, was sweet.

Large serai.

To Borazjun, 18 *miles*.—The road is again level and sandy. Nothing but a few date groves break the horizon. Three miles from Borazjun we passed the small village of Koshu—merely a few huts. Close to Borazjun we found many cultivated fields of broad beans, and also large date groves. There is a telegraph office here and the finest karavanserai in Persia. With its flanking towers it looks like a fortress in the distance. There is also a large village and good water. Borazjun is noted as the place where the Persian army, 7,000 strong, fled at the approach of the English under Sir J. Outram in 1857, leaving all their camp equipage and magazines behind them. The village lies at the foot of the hills known as Geesa Koh. Nearly all the natives we saw were armed with old-fashioned long matchlock guns and pistols. Blood feuds are common amongst them as among the Pathans on the North-West Frontier of India.

Flight of Persian army.

To Dulukki, 16 *miles*.—The road now passes along the foot of the hills, and is cut up by numerous watercourses and small ravines. The soil is gravelly and in parts stony, and the country on either side barren. About 5 miles from Dulukki the fœtid smell arising from the naphtha springs reached us. The springs are close to Dulukki. Attempts have been made to work the naphtha, which did not prove remunerative. There is a wretched cluster of mud huts at Dulukki, a filthy mud serai, and a good stream of water, untainted with naphtha, which rises just behind the village at the foot of the hills. The Dulukki river flows about a mile from the village, and on the other side are large date groves extending for two or three miles.

Naphtha springs.

Bridge over Dulukki river.

Kotal-i-Malu, or "Cursed Pass."

To Konartakhteh, 16 *miles.*—We now left the low lands, and made the first step on to the Central Asian plateau. We entered the hills, following a scarcely perceptible rocky path, which wound amongst ravines and up and down watercourses strewn with huge stones and boulders. Rain was falling in sheets, and every watercourse was a torrent. Seven miles of slow and careful marching brought us to the Dulukki river, which flows in a narrow gorge through the hills. It is crossed by a good and new stone bridge on five arches, which was built about ten years ago. The road now became extremely muddy and slippery ; the rain continued to fall, and thick clouds hung around the hills. For another 5 miles the road is a series of steep ascents and descents, and is extremely difficult and dangerous even for mules, which are obliged to go in single file. At last the foot of the Kotal-i-Malu is reached ; the ascent is extremely steep, muddy and very slippery, and a quantity of water was rushing down it. At the summit the level plain of Konartakhteh is reached, the village and telegraph station being 3 miles from the head of the pass. The plain is about 10 miles long, and varies in width. It contains enormous plantations of date palms, for which the owners pay a tax of 20,000 *tomans** a year to the Government. Besides the dates there is but little cultivation, and that immediately around the villages. There is an old serai here dating probably from Shah Abbas the Great, and very filthy. The village is small and poor.

Kotal-i-Kamaraj.

To Kamaraj, 12 *miles.*—The road, having no foundation but the clay soil of the plain, was in a very bad state from the heavy rains of the previous day. Reaching the low hills at the end of the plain, we crossed them, and then followed the left bank of a branch of the Khist river for a mile. Then, leaving the river, we ascended a narrow winding ravine, which led us through the hills to the foot of the Kotal-i-Kamaraj. The scenery here is remarkably fine ; the bold rocky hills towered above us ; and up one of them, by the edge of a precipice, goes the narrow path which leads to the top of the pass.

The plain of Kamaraj is about 1 by 2½ miles and 200 feet below the top of the pass, from which it is distant a mile and a half. The soil is rich and dark, and the whole plain is cultivated, a young barley crop was just springing up. The village is very small, and there is no karavanserai. Barren rocky hills surround the plain.

To Kazerun, 21 *miles* —Crossing the low hills at the north end of the plain, we descended 500 feet into a broad valley watered by a steam. Villages could be seen in the distance, but near the road all was barren and stony. The track is broad, but thickly strewn with loose stones. Eight miles from the hills we turned sharp to the east, and entered another valley, 5 miles broad. The road is level, though with a gradual rise, as far as Kazerun, 11 miles up the valley. We passed a little cultivation, and several streams of water. Many cattle and sheep were grazing on the fresh young grass that springs up as if by magic after the rain.

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* £6,000.

Kazerun.

Oranges.

Kazerun is a large town of between 9,000 and 10,000 inhabitants. It is under a governor, who is responsible to the Prince-governor of Shiraz. The plain all round is extremely fertile, and is well irrigated by numerous rivulets. There are extensive orange gardens, the fruit of which forms an important item of trade. The best had already been picked and sold in Isfahan. Kazerun is beyond the region of dates. We saw no date groves after leaving Konartakhteh.

Water-supply.

The regulations as to the use of water for irrigation are very stringent. The water is carried in a network of little channels with which every field communicates. Every land-owner has the right to the water for a certain number of hours on certain days. He merely taps the bank of the main channel, and so causes a continuous flow on to his field. Water is so precious that frequent quarrels arise as to the use of it, which not unfrequently terminate in bloodshed. There is a telegraph testing station here.

Kotal-i-Dukhtar or "Daughter's Pass."

To Mian Kotal, 21 *miles*.—A ride of 9 miles between cultivated fields, alternating with swampy grass lands, brought us to Pul-i-Abgina, "the Bridge of the Water Mirror," a small dilapidated bridge over a small rivulet that flows out of the marshy lake at the east end of the Kazerun plain. The hills here form an amphitheatre, one end of which comes close up to Pul-i-Abgina. The other end reaches down to the shores of the lake 2 miles on. In the centre of this amphitheatre is a wilderness of thorn bushes, growing on stony barren ground. Crossing this, we arrived at the foot of the Kotal-i-Dukhtar, "the Daughter's Pass." The ascent of the pass is exceedingly difficult, as the track is covered with large round boulders, and one must pick one's way carefully from stone to stone.

From the summit of the pass, which is 1,500 feet above Kazerun plain, a fine view of the lake and of the lower ranges of hills that form the first steps up into the highlands is obtained.

Acorns.

Mian Kotal and Kotal-i-Pir-i-Zan.

We now traversed a level, parklike plain covered with dwarf oaks. The acorns are very large and long. The poor people grind them and mix them with their flour. This plain is 4 miles long, and at the further end we reached the foot of the Mian Kotal and Kotal-i-Pir-i-Zan. The latter is merely a continuation of the former. There is a karavanserai half way up called the Mian Kotal serai, but there is no village and no food to be had.

Kotal-i-Pir-i-Zan or "Old Woman's Pass."

To Dasht-i-Arjin, 12 *miles*.—This pass is the longest and most difficult of all, the summit being 3,150 feet above the Kotal-i-Dukhtar, or 7,650 above the sea. The path is the worst we had yet seen, and our mules scarcely averaged 2 miles an hour in making the ascent. The hill-sides were covered with dwarf oaks, and on the top we found snow. It is difficult to give an idea of the roughness of the road, and of the wild and desolate scenery. The road is apparently in the same state as it has been for centuries, just a track worn by constant traffic over the least difficult part of the hills. Descending on the other side, we found the path covered with sheets of mingled ice and snow, which was rapidly melting. Before us lay the valley of Dasht-i-Arjin, "the Valley of Wild Almonds," 5½ by 2 miles. The centre is occupied by a lake, around which lie tracts of swampy ground. At the north end of the valley is the telegraph station and a few huts, which constitute the village. The lake is fed by numerous springs, which rise in the hills close to the village. The valley is surrounded by hills between 500 and 600 feet above it. From the south end of the valley the road to Shiraz is good, and presents no difficulties.

Plain of Dasht-i-Arjin.

To Khona Zanun, 12 *miles.*—We now crossed the Sina Safaid pass by an easy gradual ascent. The summit is 7,400 feet above the sea, and is marked by a ruined round tower. Here in former days a guard was posted to protect wayfarers and karavans from the robbers that used to infest all this hilly country. Now happily their services are no longer required.

Five miles from Khona Zanun we crossed the Kara Kach river on a good stone bridge in excellent repair. The river is a snow stream that rises in the neighbouring hills. The path now follows the left bank of the river; the soil is clay, and so the path is smooth. At Khona Zanun is a good stone serai and a few miserable huts. There is a large and good supply of water. An icy blast was blowing from the snows, and Khona Zanun quite sustained its reputation of being the coldest stage between Bushire and Shiraz.

Bridge over Kara Kach ("Black Mushroom") river.

To Shiraz, 30 *miles.*—The road now follows the bank of the Kara Kach, "Black Mushroom," for 2 miles more, and then enters a barren tract of country consisting of low round hills of a reddish color. The Kara Kach is a clear stream, 20 yards wide and 2½ feet deep, and flows over a gravelly bed. No cultivation is visible, even near the river. These low hills continue as far as the Shiraz plain; there is not a tree or shrub to break their outline, and the country is desolate in the extreme. Nine miles from Shiraz we crossed a small sluggish stream on a stone bridge of one arch, and a mile further on it is crossed again on another bridge opposite the karavanserai of Chinar Rahdar. We had now reached the edge of the Shiraz plain, and the blue domed mosques of the city were visible 8 miles off.

Bridges over small stream.

SHIRAZ.

Shiraz is a large town, and has between 30,000 and 35,000 inhabitants. It has always been celebrated for its beauty and delightful situation. It is built on a large and well cultivated plain, surrounded by mountains about 20 miles long by 6 broad. It is bounded on the south-east by the salt lake of Mahalu. We approached it through miles of gardens and cornfields; in the latter a remarkably thick crop was springing up.

Description of Shiraz.

Fruit.

Stream.

The *bazars* finest in Persia.

The citadel.

His Royal Highness Jalal-ud-Dowlah.

The gardens contain chiefly vines, from which the wine of Shiraz, well known in the East, is made. There are also large rose gardens, the roses being cultivated to extract rose-water. There are also fruits of many sorts—the pear, cherry, plum, peach, &c. A small stream flows through the plain to the lake of Mahalu; it is liable to floods, but at other times is fordable. The town, which is nearly 3 miles in circumference, is built almost entirely on the right bank of the stream. It contains nothing striking beyond the *bazars*; these are the finest in Persia, and were built by Karim Khan about the year 1760. The chief *bazar*, called Bazar-i-Wakil, is a quarter of a mile long. It is built of yellow bricks, arched at the top, and is very lofty. It is lighted by holes placed at intervals in the arched roof. On each side of the central pathway are built small cell-like chambers in front of which a platform, 3 feet high, is erected, On this the merchants sit amongst their goods, while the cells behind contain the remainder of their stock in trade. The town is exactly like all other Persian cities. The houses are flat-roofed, with blank walls forming narrow, unpaved lanes. In the centre of the town is the "citadel," a fortified place about 80 yards square, and surrounded by a brick wall with flanking towers. It has suffered from the earthquakes to which Shiraz is liable, and one of the towers leans outwards about a foot and a half, while the walls are rent with cracks. Here lives Jalal-ud-Dowlah, the grandson of the Shah, a boy 18 years old. He is a minor, and the government of the province is in the hands of his uncle, the Sahib Diwan. We interviewed them both, and were received most civilly by the Sahib Diwan. The young Prince was very awkward and stupid, and neither bade us welcome, nor originated a single remark during our visit; neither could we extract any but monosyllables in reply to our questions.

French tutor.

Sahib Diwan. His extortion of money.

Curiosity as to our reason for travelling.

He is educated by a French tutor, who is said to be a "Russian spy" and intriguer. We did not see him. The Sahib Diwan is occupied chiefly in laying up riches for the time when his office will cease. The poor people are greatly overtaxed. In one village—Sevend—where we passed a night with the telegraph clerk, we heard that in the last few years the taxes had been raised from 450 *tomans* per annum to 4,500. The Sahib Diwan was most curious to know why we two British officers were travelling through Persia. That we were travelling for pleasure was too preposterous an idea for him to entertain for a moment. We created a good deal of interest, and our movements were followed, no doubt, pretty closely. The Russians in Tehran, for example, received telegraphic news of our arrival in Shiraz from their Agent there. Nevertheless, we were free to come and go, just as suited our convenience, and passports or any credentials were things apparently unknown.

Nawab Haidar Ali Khan, British Agent.

The Nawab Haidar Ali Khan is the British Agent in Shiraz. He is an extremely civil and obliging man, and is a British subject. He can only speak a few words of English and no French. He is the brother of Hussain Ali Khan, who accompanied the British party of the Russo-Afghan Boundary Commission.

Manufactures, &c.

After the wine and rose-water, the principal produce of the Shiraz *bazars* are arms, cutlery, glassware, gold, silver, brass, and earthenware *kaliuns*, or water pipes. In addition to these, there are quantities of Manchester piece-goods and Birmingham hardware, and the usual complement of butchers, grocers, fruiterers, shoe-makers, and hatters ; and separate *bazars* are devoted to gold embroidery and manufacture of all sorts of copper vessels. Black lamb's wool skins, known as Astrakan fur, are exported from here, and are bought up by Russian traders from Astrakan. Hence the name.

Telegraph.

There is a staff of half-a-dozen telegraph clerks here, together with an assistant superintendent and an English doctor. They live in the Bagh-i-Shekh, a large garden close to the town.

Irrigation.

From Shiraz to Tehran all cultivation is irrigated by *kanats*, a system of underground streams. (The Isfahan plain alone must be excepted ; that is irrigated by the water of the Zainda Rud). The system of *kanats* is as follows :

Kanats.

a shaft is sunk at the foot of the hills, or on some rising ground, and a tunnel is constructed in the direction where the water is required. The water flowing in this tunnel is led gradually to the surface of the ground, the tunnel of course being made with a slight fall, and the surface having a sharper fall, the two meet. The tunnel ceases, and the water flows in an open stream, and is conveyed in every direction by a series of channels. Manholes are made at regular intervals for the repair of the *kanat*, for the tunnel receives no supporting brickwork or beams. These *kanats* may be traced for miles over the wide expanse of desert, several sometimes converging on a village that lies in low ground.

The Wazir seemed well disposed towards the English, and apparently thought very highly of the telegraph.

Roads from Shiraz.

From Shiraz karavan routes lead to the following important towns :

			Miles.
Shiraz	to	Isfahan	298
,,	,,	Bushire	183
,,	,,	Shustar	300
,,	,,	Bandar Abbas, ...	330
,,	,,	Kirman	365
,,	,,	Yezd	245

The Road from Shiraz to Isfahan.

Once on the great Central Asian plateau, the road is for the most part level. Between Shiraz and Isfahan the country consists of ranges of low rocky hills, between which lie extensive barren plains, devoid of houses, trees, or bushes, and covered with stones. Until the eye can accustom itself to the vastness of the landscape, it is exceedingly difficult to estimate the distance of any object. Often we could just discern our next stage (with the help of glasses) 15 or 20 miles off, with nothing between us and it but the barren plain, and the line of telegraph poles vanishing in perspective. The track is broad and good, consisting of sometimes as many as twenty little mule paths running parallel, thus clearly defining the road.

Post horses.

From Shiraz the line of post horses commences. At every stage along the road are kept five and sometimes six horses. These are used to convey the weekly mails, and are also at the disposal of travellers. The tariff is fixed at 2*d.* per mile per horse. The horses are miserable creatures, covered with sores, and very much overworked and overweighted. Still they can do a stage of 25 miles in about 3½ hours. The post line, the "chappar" as it is called, continues to Kasvin 108 miles north-west of Tehran; also from Tehran to Kermanshah, 300 miles, and from Tehran to Mashhad, 450 miles.

Zergoon, 20 *miles*.—Leaving the Shiraz plain, the road ascends steadily for 7 miles; it is stony and rough, and winds amongst the hills. Two *farsakhs* from Shiraz there is a karavanserai with a plentiful supply of water, which lies at the foot of a steep descent. Another small plain, with another ascent and descent, brought us to Zergoon. The road is stony, but quite easy; the country on either side hilly and barren. It became very cold the moment the sun set, and froze hard. Zergoon is a small hamlet, with a good water-supply, and extensive cultivation around it. It lies at the foot of hills, and is visible from the top of the last ascent with the glasses.

Lake and causeway.

Buudemir river.

Bridge.

Persepolis (Takht-i-Jamshid).

Pusa, 20 *miles*.—Hence the route is north-north-east, across long valleys, commanded by high hills. Shortly after leaving Zergoon, we approached an extensive marshy lake; it runs east and west as far as the eye can reach, and is crossed by a causeway a mile long. The causeway is about 12 feet wide, and made of large stones; it is full of inequalities, and very slippery. There is not room for a laden mule to pass laden camels. A string of the latter were crossing as we arrived, and we had to get off the causeway at a point where the lake left a patch of dry ground. After this the road is smooth and level. The Bundemir river is crossed, running from left to right; it is a deep stream, 40 yards wide, the water muddy. It is crossed by a stone bridge very much out of repair. We now entered upon a large plain, much cultivated, and reaching to the hills, at the foot of which the ruined pillars of Persepolis were visible. The road leaves the ruins 1½ miles to the right, and 2 miles further on is the *chappar-khana* or post-house of Pusa. There are no supplies here, and we had to send to a village 2 miles off for food. Immediately behind the *chappar-khana* runs the Murghab river, a small stream, which we crossed by a ford 3 feet deep.

Fords over Murghab river.

Taxes.

Price of provisions.

Vineyards.

Sevend, 16 *miles.*—There are two roads to Sevend—one by Saidoon, 24 miles, and the other, a short cut, 16 miles. The latter can only be used when the rivers are low. We followed the shorter, a good path through fields. After 8 miles we reached the Murghab river again, and forded it. It is broader here, and the water not more than 2 feet deep. We then followed the left bank along the foot of the hills, ascending the broad ravine in which the river flows. The scenery is very fine, lofty crags bounding the valley on either side. Another 8 miles brought us to Sevend, a village of 4,000 inhabitants built on the hill side. There is a telegraph office here. The village is very poor, and has been greatly overtaxed by the Sahib Diwan of Shiraz. A few years ago it paid taxes to the amount of 440 *tomans* a year. Since the Sahib Diwan came into power, they have been raised to 4,500 *tomans* annually. The people are ruined, and provisions are very dear. A sheep costs a *toman*, about 6*s*. 8*d*., and a fat fowl 1½ *krans* or 10*d*., when formerly the prices were little more than half these sums. On both sides of the river are vineyards, where the small standard vine, about the size of a gooseberry bush, is grown. The grapes are not suited for making wine. A stream of water runs through the village, where corpses are washed before burial. This is also used for drinking purposes.

Tang-i-Turkan.

Tomb of Cyrus and Pasargadœ.

Fertile plain.

Murghab, 28 *miles.*—Leaving Sevend, the road winds through a wide valley irrigated by the Murghab river, which is crossed by a stone bridge 1½ miles distant from Sevend. The ground is cultivated and irrigated by numerous *kanats*. At 7½ miles we passed the foundations of a fine new stone karavanserai and a small village with a *chappar-khana*. After another 5 miles a narrow gorge is entered northwards. The scenery is pretty, and a few dwarf oaks are dotted about. The road has hitherto been good, but it narrows at this point, and 2 miles further on we had to climb round the shoulder of the rock which comes vertically down to the river banks of the Murghab river. The river is here a mere stream, 20 feet wide, with a marshy bed full of willows. We went on for another 6 miles and then reached the Tang-i-Turkan, 20 miles from Sevend. "Tang" means a defile. The cliff here comes down to the river, and a clean cut path, 4 feet wide, has been made through the living rock. It is 50 yards long, and winds slightly. The walls are vertical, and rise well above the head of a man walking. Laden camels have to be unloaded before passing through, but mules can usually pass with their loads. From the north side are seen the tomb of Cyrus and the ruins of Pasargadœ. We now entered upon a well-watered undulating plain, affording good pasturage to thousands of sheep and cattle, and more than one village was visible. Murghab lies to the north extremity of this fertile plain, and 6 miles from Tang-i-Turkan. Murghab is thriving for a Persian village, and the bread is better than we had yet had. The villagers manufacture carpets and druggets in their cottages.

Dehbid, 28 *miles.*—Hence the road for the first 3 miles is very rough and stony, and crosses a low range of rocky hills, whence we descended into a wide barren plain, which we crossed till we reached the Murghab river again and the karavanserai of Khana Kergoon. The serai is large and well built, and a few huts are clustered round it.

Bridge.

Stream liable to floods.

Dehbid : Height of—

Firewood.

Khana Kergoon, 16 *miles.*—The river is crossed by a stone bridge, but is easily fordable. For the next 12 miles we crossed an immense expanse of undulating desert with a gradual fall to the east. Rain began to fall in torrents, and towards evening changed to snow, and the road became very muddy and slippery. Not a tree was to be seen, nor any signs of life. Two hundred yards from the telegraph office we crossed a small stream, which after heavy rain becomes so swollen as to be impassable even on horse-back. Dehbid is 7,500 feet above the sea, the highest telegraph station in Persia. The cold in winter is excessive, the thermometer being for days together at zero, and the desert covered deep with snow. Even in summer it is never hot here. Firewood is very scarce : it has to be fetched from over the hills, many miles away, on mules, donkeys, cows, and every available means of transport. A small hamlet of 50 souls is collected close to the telegraph office. This is indeed a desolate spot, 56 miles from the nearest European, and in the centre of a howling wilderness.

No supplies.

Karavanserai.

Sirdar Muhammad Khan.

Khana Khorah, 18 *miles.*—Food must be taken from Dehbid, as at Khana Khorah nothing is obtainable in the way of food, even for the hardy muleteer. Twelve miles of a gradual ascent over the downs, which were covered with melting snow, brought us to the north edge of this cold plateau, and an easy descent of 6 miles more took us to Khana Khorah, and a warmer climate. The actual cold would have been nothing had it not been for the terrific wind that swept the cold air into our faces, and completely benumbed us all. The serai here is large and clean, and the water excellent. We found here Sirdar Muhammad Khan, who passed himself off as a satellite of the Prince of Isfahan—the Zilh-i-Sultan—taking a message to Jalal-ul-Dowlah at Shiraz. We afterwards heard that he was a follower of Ayub Khan, and had been expelled from Tehran for intrigue, and was now being sent to the British Resident at Bushire, *en route* for India.

Surmeh, 26 *miles.*—From Khana Khorah the road traverses a desert plain, varying in width from 3 miles at Khana Khorah to more than treble that distance further on. The hills on our left (west) were snow clad to their base, while on the east there was none. Surmeh can be seen about 15 miles off on slightly rising ground. There was nothing between us and it to obstruct the view. It is a large village, with large orchards, enclosed with walls extending for 2 or 3 miles to the south. There are numerous *kanats*. Supplies are here plentiful, and the bread is well known for its excellence. It is ovened and well baked, and made in flat cakes the size of a dinner plate, half an inch thick.

Abadeh, 15 *miles.*—The road continues of exactly the same character. Before reaching Abadeh, we passed numerous walled gardens and irrigation streams. The village is enclosed within a mud wall, 20 feet high and entered by a strong gateway. Just outside is the telegraph office, the serai, and *chappar-khana.* The walls were built to resist the attacks of robbers, which formerly were of frequent occurrence. The village, though only of mud, like the others, is well-to-do, and the large fruit gardens are a source of much wealth. Abadeh is famous for its wood carving, of which we saw some very pretty specimens. The wood of the pear tree is generally used.

Babi sect.

Here are also the head-quarters of the sect known as Babis, which sprang up in the first years of the fanatical sect, who took the name of Bab, and held the most socialistic principles. Great numbers of *mullas* and educated men joined him, which fact would seem to show that Islamism is not so deeply rooted in the country. The Shah determined to put down this sect, and many hundreds of them fell fighting against his troops. From that time the Babis have been obliged to conceal their creed, but their numbers, though reduced, are certainly increasing. Soon after their partial extermination, the Babis formed a plot to assassinate the Shah when going out shooting. The conspirators were seized, and, after having undergone the most brutal tortures, were put to death.

Shulgistun, 20 *miles.*—After passing through half a mile of high walled gardens, the road emerges again on the barren wind-swept plain, and continues in unbroken monotony to Shulgistun. The village is small and surrounded, like Abadeh, with a high mud wall. A semi-ruined mosque, with a blue tiled dome, lends an air of importance to the place when seen at a distance. The villagers own large flocks of sheep and goats, which we saw returning from their day's wanderings in search of pasture.

A unique village.

Natives.

Yezdikhast, 20 *miles.*—The road is an unbroken desert, and differs in no point from yesterday's march, till suddenly we reached the bank of a deep and wide ravine, quite invisible till we were actually upon it. Yezdikhast is built upon a long narrow mound in the centre of the ravine and the mud houses, tier upon tier, seemed almost to overhang the cliff. It is entered by a draw-bridge at one end, and a narrow dark lane, half built over, leads from the gateway down the centre of the village. We were struck by the healthy, ruddy complexions of the villagers, hardly to be expected from a residence in this noisome spot, which literally leaked with sewage at every possible outlet. A stream of good water flows down the ravine, and is crossed by a stone bridge. On the south side is a handsome brick karavanserai. In olden days Yezdikhast was doubtless a strong fortress, calculated to resist any attacks that might be made upon it by bands of robbers.

Maksud Beg, 24 *miles.*—The valley now became very wide, and villages were discernible, through a thick mist, lying at the foot of the hills to the west. After about 11 miles we passed the

Aminabad.

fortified village of Aminabad and a semi-ruined karavanserai. Maksud Beg is approached through many acres of ruined mud houses, old *kanats*, and a few cultivated fields, shewing traces of the depopulation caused by the famine of 1872, from which the country is only just beginning to recover. The village is new, and surrounded by a substantial mud wall. It lies in fertile ground, well cultivated by streams and *kanats*.

Small town with *bazars*.

Taxes.

Kumishah, 15 *miles*.—The road now runs at the foot of the hills on the east side of the valley, with a wide and fertile plain on the left, covered with villages, gardens, and pigeon towers. The last form a new feature on the landscape. Before the famine they were tenanted by thousands of pigeons, but now many of them are empty and in ruins. Orchards and fields continue up to the ruined mud wall of Kumishah, and inside one sees ruins everywhere. All the houses are of mud. The telegraph office is the only substantial building in the town. The population is about 2,500. We visited the *bazars*, which, though unpretending from an architectural point of view, are well supplied with butchers, bakers, grocers, shoemakers, coppersmiths, &c. The *bazar* pays taxes to the amount of 1,000 *tomans* a year. The valley contracts here, and lofty hills tower above the town. Passing out on the north side, we saw more ruins—everywhere ruins in fact—which have a most depressing effect. Once outside the walls, flourishing gardens and fields take the place of ruins.

Jealousy of Persian founders.

Mayer, 19 *miles*.—There is a steady gradual ascent for 5 miles. A ruined round tower marks the wartershed and the end of the cultivated ground. A desert stretches away to Mayer, situated beneath bare brown hills, and ruins surround it. There is a fine serai, falling to ruin for want of a little repair. Nothing ever is repaired in Persia. Handsome serais and bridges are built, nearly always by charitable persons, and are allowed to decay. The founders die, and it is no one's business to care for them. The next benevolent person prefers to build something that will add renown to his own name instead of repairing what is already done.

Marg, 20 *miles*.—The ground now rises for about 12 miles to the foot of the hills, which here bend round from the east to north-west, and are crossed by a low and easy pass. Desert lies on the other side, though in the far distance are seen many villages and gardens looming out of the mirage. At Marg there is nothing but a *chappar-khana* and karavanserai.

Isfahan, 9 *miles*.—A steady ascent to the summit of a barren ridge has to be made, and then the city of Isfahan is seen spread out in the valley below. An easy descent brought us to a narrow winding lane among high mud walls; the silence that reigned around was striking, and we passed no one. This is the entrance to Julfa, a populous suburb of Isfahan, inhabited exclusively by Armenians and other foreigners.

ISFAHAN.

Description of Isfahan.

The modern Isfahan is very different from what it was in the brave days of the powerful Shah Abbas the Great. It was then one of the finest, wealthiest, and most populous cities of Asia. The walls, it is said, were 12 miles in circumference, and the inhabitants numbered some 600,000 souls. The city has never recovered from the attacks of the Afghans under Mahmud of Ghazni in 1722.

Isfahan is situated in a beautiful plain on the left bank of the river Zainda Rud, which rises in the Zardah Koh, and, after passing Isfahan, is lost in irrigation. The vast plain is almost entirely surrounded by hills, and is covered for several miles with extensive fruit gardens and vineyards. Water for irrigation is conveyed in a network of small channels from the Zainda Rud, "the Living River." A laybrinth of narrow lanes and high walls is spread all through the gardens, only to be threaded by the initiated. Julfa is a thriving suburb, and contains the dwelling houses of some 3,000 Armenians, many of whom work in Isfahan all the day. Here also are the English mission house, chapel, schools, and factory. The field of their labours is limited to the Armenians. The Shah will permit no axe to be laid at the root of Muhammadanism. Their schools contain 300 boys and girls. They are taught English in addition to the usual curriculum of studies, and it is pleasant to be saluted with a cheerfull "Good morning, Sir," by the Armenians in this out-of-the-way spot. Dr. Bruce, the head of the mission, is assisted by an able staff of clergymen and ladies. Having passed through the school, the young Armenians are taught useful trades in the factory to enable them to earn their bread.

The Zainda Rud is crossed by three bridges—one small, about a mile above the town, where the river is narrow; another leading to the avenue known as Chahar Bagh at the west side of the town; and, lastly, a very handsome brick bridge still lower down. This one was built by Shah Abbas, has 34 arches, and is still in thorough repair. Opposite the city the river has a very wide gravelly bed, where, when it is low, the water flows in several small channels.

Crossing the centre bridge, one rides along the Chahar Bagh, which is planted with rows of fine *chenar* (plane) trees, and presently reaches the great square known as Maidan-i-Shah. It is a large gravelly space, 600 by 200 yards, where the Zilh-i-Sultan holds the parades of his troops. On the west and east sides are substantial brick built barracks, double-storied. These were empty, as the troops had not yet mustered after the winter, at which time of the year they are allowed to go to their homes. For this reason we had not an opportunity of seeing them, but they are reported to be (for Persians) an efficient body of men. There is no doubt that the rank and file are good material, but their weak point is their officers. The Madrassa-i-Chahar-Bagh is the finest in Isfahan. A *madrassa* is a college where students are taught all the doctrines of the *Koran* and the standard *Shiah* works; also mathematics, astronomy, and the works of the Persian poets. This particular *madrassa* is a very large double-storied building, enclosing a courtyard and tank. Small rooms are ranged round three sides, where the students live, and on the fourth side is a very fine mosque. The mosque and the whole building is decorated with inlaid colored bricks, disposed in pleasing geometric patterns. Many poor students come here from the provinces, and are taught *gratis*. The whole management of the *madrassa* and the instruction is in the hands of the *mullas*.

The *bazars* are very extensive, but have no architectural beauty. We rode all through them. They were so crowded that if our horses had kicked, the people could not have escaped. The manufactures include all kinds of arms and cutlery, for which Isfahan is celebrated; also cotton cloths, gold brocades and embroidery, paper, glassware, and all kinds of copper vessels, shoes, sweetmeats, gold and silver *kaliuns*, &c. Poppies are much cultivated in the neighbourhood for the manufacture of opium, in which a large export trade is carried on by two Dutch and one English firm. Cotton is also grown extensively in Persia, and is chiefly consumed in the country. The soil of Isfahan produces the finest cotton in Persia; but as all merchandise must be carried on mules or camels for hundreds of miles before it can be shipped, but little surplus is grown. Silk forms another of the chief products of Persia. The best comes from Ghilan, and an inferior quality from Mazanderan. It is exported in a raw state. A considerable quantity is also consumed in the country; but as Muhammad forbade his followers to wear silk, it is necessarily mixed with cotton for the use of the faithful. Still pure silk fabrics are produced at Isfahan, and are very beautiful. Kashan is also famed for its silk fabrics.

The Zilh-i- Sultan.

Sultan Masaud Mirza, Zilh-i-Sultan, is the governor of the Isfahan province, and also rules over an extensive tract of country reaching away to the western frontier of Persia, and including Luristan and the Bakhtiari country. He is the eldest son of Nasr-ud-din Shah, and was born in 1848; yet not having been born from a Kajar princess, he does not succeed to the throne on the Shah's death. He is an exceedingly able and powerful man, and is generally considered to have more influence than the Shah himself. The whole of southern Persia is practically in his hands. He is known to be well disposed towards the British, and it is his interest to be so. It is no secret in Persia that the Zilh-i-Sultan on the Shah's death is prepared to contest the throne with the Walya'had, the heir-apparent, his younger brother. The Walya'had is the exact opposite of his elder brother. He possesses no strength of character, and is completely priest-ridden. He is also a ready tool in the hands of Russian intriguers, who will no doubt support him when the time for action arrives. The general opinion is that the Russians will assist him to crush the Zilh-i-Sultan, place him firmly on the throne, and then quietly annex a portion of his territory as the price of their assistance. No one with whom we spoke seemed to think that there was the least chance of the British interfering in the matter. Indeed, we could hardly with justice interpose in behalf of one who has no right to the throne, albeit there is no doubt he would make by far the better monarch of the two.

The Kajar dynasty has been conspicuous from its founder, Agha Muhammad Shah, down to the present ruler for its acts of cruel treachery, its ingratitude, and, above all, its jealousy. Each Shah, actuated by feelings of reasonless jealousy, has foully murdered the prime minister that assisted in placing him on the throne and consolidating his power, to say nothing of the frightful acts of Agha Muhammad and Fath Ali Shah. With such a record amongst his ancestors, it is not difficult to suppose that the Zilh-i-Sultan, ambitious and clever as he is, would not scruple to depose and murder his brother if he had any chance of doing so. As a governor of provinces, he shews marked energy and ability. The province and frontier near Kermanshah had, when we arrived, been recently added to his sphere of government. The high road on the frontier was invested by gangs of robbers headed by Jawan Mir. The prince lost not a moment in organizing a body of 3,000 troops, who attacked the robber's stronghold, defeated and slew many of them, and captured Jawan Mir and twenty more of the ringleaders. We ourselves met their twenty-one heads being carried on a mule under an escort of cavalry to be presented to the Zilh-i-Sultan. The prince is reported to have said "In Persia no one knows anything; it is better so. I know nothing, but I can govern provinces." The prince is a keen sportsman, and has organized enormous "battues" of driven antelopes, wild goats, &c., in which he alone is permitted to shoot. Like all his family, he is a wonderful rifle and pistol shot.

The Road from Isfahan to Qum.

Festival of Nao Roz

From Isfahan to Munchikar, 40 *miles.*—On the 21st March we left Isfahan *en route* to Tehran. It was the Persian new year's day; and as we crossed the Zainda Rud from Julfa and entered the city, we found all the inhabitants in holiday attire, freshly shaved, and wearing clean linen. We rode through the deserted *bazars*, where every shop was shut, except only a few that supplied the necessaries of life. The next ten days are devoted to pleasure, and many formal calls are made, much tea is drunk, and many *kaliuns* are smoked. It was quite an hour before we left behind us the last of the suburbs of Isfahan, and emerged on to an open plain irrigated by "jubes," or ditches, that brought water from the Zainda Rud. The soil is rich and very prolific, and poppies are largely grown.

To Gez, 16 *miles.*—Gez is a solitary and semi-ruinous karavanserai, and here the cultivation ends and stony desert begins. For the next 24 miles, with the exception of a low spur from the hills, which we crossed, barely 200 feet high, the road is a dead level right up to Munchikar. There is no water to be had *en route.* Munchikar is a cluster of half ruined mud houses, and is the first post stage from Isfahan. Water is plentiful, and flows in streams from the *kanats.* A few cultivated fields surround the village.

To Soh, 28 *miles.*—For the first 23 miles we traversed an enormous expanse of gravelly desert; then we crossed a ravine or nullah down which a stream was flowing, and ascended the right bank. It gradually widened, and presently we found fields. The hills approach the left bank and a mile from where we crossed we passed Bideshk, the posting stage, a village half a mile from the road, and on the other side of the ravine. The path now became rough and rocky. Many walled gardens were planted in the ravine, which prevented us seeing Soh till we were quite close. The village is of the common mud-built type. There is a telegraph station here and a good karavanserai, built on the left bank, which is considerably above the bed of the stream. The cold here last winter was such that a Persian who had ridden a few miles off on some business was frozen to death rather than dismount and walk to keep up his circulation. His body was frozen hard before he was dead. No Persian will ever walk if he has so much as a donkey to ride.

The Kohrud hills.

Fertile valley of Kohrud.

To Kohrud 20 *miles.*—At first our road lay over low hills, and we kept gradually ascending till we reached the "gardan" or neck, the highest point in the pass over the Kohrud hills. The ascent is long and gradual, and here and there we found a few steep places. A great deal of snow still remained in the pass, and the beaten track was soft, and our mules constantly sank up to the girths. The descent from the "gardan" is steep, but short; and, after the first steep part, we followed a ravine, and in less than 2 miles reached Kohrud village. Kohrud is a perfect oasis; it is built in the ravine, which here widens, and afterwards contracts again. A beautiful stream flows through it, fertilizing the ground to a marvellous extent. The ravine is full of walnuts, poplars, and all kinds of fruit trees, and the houses are grouped in picturesque clusters. one above the other, on the hillside. The scenery was lovely, the hills rising high above the village on every side. As is always the case in Persia, the locality being fertile, the bread was excellent that we got here, and butter also was procurable for the first time. We met here a Russian Armenian. He was staying in the post-house (*chappar-khana*), and said that he was travelling for a firm in Odessa, taking photographs, and prospecting for walnut wood. Unfortunately he had left the specimens of his art and his camera in Isfahan. Altogether he seemed a suspicious character.

Ruins.

Kashan, 28 *miles.*—We continued to descend a lovely gorge, which was thickly wooded for a mile with walnut and fruit trees. The path was very rough and rocky, but the descent gradual. After 10 miles we reached the open plain, a desert which stretched to the horizon. Kashan was just visible with glasses. The plain was bare and stony, and it was not till we approached Kashan that we found any cultivation. Ruins abound on every side—ruined walls and ruined houses; in fact, half the town seemed to be in ruins.

Silk manufactures.

Brackish water.

Kashan is a large town, and is celebrated for its silk manufactures, for which the raw silk is grown in the province of Ghilan. We had not been long in Kashan before some dealers came to us with tawdry specimens of silk scarves and handkerchiefs. Persia was still *en fête* for the Nao Roz, "New year's day," and the *bazars* here were closed. The water in Kashan is very brackish and salt, and it is impossible for any one not used to it to quench his thirst; for the more he drinks, the thirstier he becomes. After a time, however, it ceases to have that effect. There is a telegraph office here, and we heard from the clerk in charge how fearfully Kashan suffered during the famine and cholera. It has never recovered. The country is now level, and patches of sand alternate with cultivation. We passed a few fruit gardens; the trees were just blossoming. Fourteen miles from Kashan we passed a large karavanserai and a few houses. This district is famous for its melons—the Kashan melons—which are taken to all parts of Persia. The road is level as far as Sinsin, and is cultivated and irrigated with many *kanats*.

To Sinsin, 24 *miles*.—Sinsin is the posting stage, there are only two or three huts besides the *chappar-khana*. We provided ourselves with food here, and pushed on to Shurab, a lonely karavanserai, 12 miles further on. Sinsin lies at the foot of some low barren hills, which we now crossed; the road is quite straight, and the ascent gradual.

Shurab.

To Shurab, 12 *miles*.—At Shurab nothing is procurable but water and a little firewood. The karavanserai is spacious and in good repair. It lies at the foot of some hills, and faces an expanse of undulating stony desert.

Mount Demavend.

To Pasangun, 12 *miles*.—We now sighted the magnificent peak of Demavend, 19,650 feet high. It is in the Elburz range, and is 42 miles east-north-east from Tehran, and in round numbers 150 miles from where we first saw it. It was covered with snow, as was also the whole range of Elburz, above which its pointed peak towers about 10,000 feet. The road to Pasangun is stony, and traverses undulating downs, with a range of hills about 2 miles to the left. The stage suddenly appears in a hollow. There is nothing here but a karavanserai and *chappar-khana*.

Sacred city.

Burial place of kings of Persia.

To Qum, 16 *miles*.—The famous golden dome of the chief mosque of Qum can be seen 10 miles off glittering in the sun. Several miles south of the city we came upon cultivated fields irrigated by *kanats*. The road is level and good. The city is built on an enormous plain, at the foot of the hills which bound it on the west, and on the banks of a stream, which is afterwards lost in the great salt desert to the eastwards. It has been an important place, but its day is over. After entering the city, which is an open one, we rode through 2 miles of narrow lanes and ruined houses. The *bazars* have been very fine. They were of stone with arched roofs, but in many places the roof has fallen, leaving only the arches, and the shops are but few. Qum is a sacred city, and thousands perform pilgrimages to the shrine of Fatimah, the sister of the Imam Rezha of Mashad, who was buried there. The great mosque also contains the tombs of Shah Safy, Shah Abbas II, Fath Ali Shah, and Muhammad Shah.

Transport of corpses.

Hundreds of corpses are brought here to be interred in the sacred city, and we passed many on the road lashed to a pole, and placed on the back of a mule or pony.

QUM.

Description of Qum.

Fanaticism.

Bridge.

The city is not celebrated for any manufactures. The inhabitants are peculiarly fanatical. There is a telegraph office here, and a former clerk, who had been so ill-advised as to rouse the anger of the fanatical inhabitants, had to flee for his life at a moment's notice. A fine stone bridge of nine arches crosses the river. The river was low when we saw it, but it is liable to very sudden floods. In one of these floods the old telegraph

Water.

office, which was built near the river bank, was quite swept away. The water of Qum is, like that of Kashan, very brackish, but rain water is collected in large tanks, which serves for the greater part of the year.

The Road from Qum to Tehran.

New Persian lake.

From Qum to Tehran there are three roads. The shortest and best is the centre one of the three. On the east runs the old karavan road, and on the west the present post road. It is quite new, and was made by the Amin-i-Sultan, one of the Shah's ministers, as a private speculation. It runs as nearly as possible in a straight line ; there is no attempt at metalling ; the road is made, or rather defined, by two parallel trenches dug in the desert. Two rivers have to be crossed, the Kara-Su and the Shurrud. Bridges were built by the contractor without any foundation, so that when the first floods came, they were washed away. Before this happened a service of *troikas*, *tarantasses*, and *droshkies* ran between Qum and Tehran, performing the journey of 100 miles in 14 hours. Handsome karavanserais, rest-houses, and tea shops were erected by the Amin-i-Sultan at each halting place regardless of expense. However, the Persian muleteers and travellers were such conservatives, that they preferred to use the old road to which they were used. Seeing this, and fearing that his speculation would prove a loss, the Amin-i-Sultan ordered some embankments of the Kara-Su river to be broken, and the water thus released flooded many miles of desert which the old road traversed. The old road was thus rendered impassable, and the traffic diverted on to the new road.

Bridge.

From Qum to Manzarieh. 18 *miles.*—The first stage from Qum is Manzarieh. The road is level, and in parts where the soil is gravelly, it is sound and good. When a clay soil is found it is soft and very much cut up. The river Kara-Su is crossed, the rotten bridge having been replaced by a new stone one. Manzarieh lies at the foot of some rocky low hills, and has a large karavanserai and a *mihman-khana* or rest-house. There is plenty of good water, but nothing else obtainable. The road lies through a desert again ; in fact, the whole country between Qum and Tehran is desert. There is not a single field or garden to be seen till the Tehran plain is reached. During this march we passed the lake caused by the flooding of the old road. The water extended as far as we could see to the east. The road is good throughout.

Tea shops.

To Aliabad, 22 *miles.*—At Aliabad is a large new karavanserai, rest-house, and tea shop, and excellent and abundant water. Aliabad stands on high ground, covered with hillocks of brown cinder-like rocks. The tea shops are allowed on this road for the use of pilgrims to Qum. They are clean, and well supplied with Russian *samovars* or urns, Russian teapots and glasses, and Russian sugar.

[From this point we were compelled to diverge from the new road to the old, as one of the cheap bridges, which had been washed away, had not been repaired. The bridge on the old road was still standing.]

To Hasanabad, 28 *miles.*—Leaving the new road, we turned off to the east, and entered a part of the desert known as the "Valley of the Angel of Death." The soil is sandy, and the ground much cut up with hillocks and dry nullahs. About 14 miles brought us to the old road, where there is a ruined karavanserai. We crossed the Shurrud river on a rather rickety bridge, partly wood, partly stone. The river was then about 100 feet wide, and a large volume of water was rushing down. It was quite unfordable. We now crossed some sandhills, and entered the fertile plain of Hasanabad, which stretches east and west to the horizon, and is covered with cornfields. Five miles from the river is the *mihman-khana* of Hasanabad, and 2 miles further on the little village and karavanserai.

To Tehran, 30 *miles.*—We were now on the new road again, and went straight on across the plain, and crossed a low hogbacked range of rocks that divides the Hasanabad plain from the plain of Tehran. Day dawned as we reached the top of the ridge, and disclosed the beautiful landscape lying before us, and Tehran, 20 miles off, close at the foot of the Elburz range. The plain of Tehran, which we now crossed, is very fertile, and well watered by streams. On every side we saw cornfields, villages, and gardens, amongst which our road now lay. As we drew near, the golden dome of the *masjid* (mosque) of Shah Abdul Azim was seen shining in the sun amongst the trees which surrounded it. The new road was crossed by numerous streams, which converted it into a deep bog; and in one place an enterprising farmer had taken advantage of the suspension of the *droshkies*, &c., and ploughed up a large portion of it. From the mosque of Shah Abdul Azim to the gates of Tehran is 3 miles. There is now a good metalled road* made by a Belgian engineer, and planted on both sides with trees.

Plain of Tehran.

TEHRAN.

Description of Tehran.

The capital of Persia is situated at the foot of the Elburz range, and 4 miles north-west of the site of the ancient city Rhe (which is mentioned as Rhages in the Apocrypha). Approaching the town, on the Isfahan road a few domes and a great deal of verdure are visible above the walls. Tehran is about 11 miles in circumference, and is surrounded by a curtained and bastioned rampart of mud of modern profile and a dry ditch, both broad and deep. Two thirds of the space thus enclosed is not yet built upon, and is merely a dreary waste. The old part of the town, including the *bazars*, is similar to all Persian cities, and the streets narrow and dark. The *bazars* are distinguished by no architectural beauty, and are far inferior to those of Shiraz. Still they are very extensive, and apparently rich and densely crowded. The modern part of the town is very different. Here the members of the Corps Diplomatique

Defences.

Bazars.

Moderan Tehran.

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*NOTE—A railway from Tehran to Musjid-i-Shah Abdul Azim was opened in June 1888.

reside, all in their own houses, which are Europeanised to a great extent, and stand in pretty gardens. The streets are all broad and metalled, and planted with flourishing young trees; and handsome well turned out carriages are seen driving about. In Tehran every Persian who can afford it possesses a carriage (or two). There is a large *maidan* or square in this (modern) part of the town, built all round with two-storied magazines, stores, and gun sheds. The buildings are profusely ornamented with colored tiles disposed in geometrical patterns, and with large gaudy paintings, of the "Lion and Sun," the Persian emblem. Lofty ornamented gateways of brick lead into the square, where slovenly sentries are seen lounging about.

The *maidan*.

The British Legation is by far the handsomest and best appointed of any in Tehran. It stands close to the ramparts near the Shemran gate. It consists of the Legation itself, a large brick building, and a tall clock tower, containing a large suite of beautifully decorated reception rooms and dining room in the English style. There are separate houses for the minister, *chargé d'affaires*, and the secretaries, the doctor, and the clerk to the Legation. These, together with the Legation building itself, all stand in a large garden, enclosed by a high brick wall. The gardens are beautiful, and are planted with rows of tall *chenars* and poplars, and a variety of fruit trees. Mr. Nicholson, the *chargé d' affaires* in the absence of Sir R. Thompson, showed us the greatest hospitality during our stay, and assisted us by every means in his power. He is reputed to be very popular with the Persians from the Shah downwards, and his pleasant genial manner, together with his wholesale charity to the poor in winter, have made him many friends in all ranks. We cannot be sufficiently grateful to him and to all other Europeans we met, who, with only one exception, welcomed us as old friends.

British Legation.

The climate of Tehran reaches extremes of cold and heat. During the three winter months snow falls in great quantities. Towards the end of March mild spring weather sets in, roses bloom in luxuriant abundance, and nightingales begin their song. During the intense heat of summer the Court and the nobles leave Tehran. The British Legation encamps at the village of Gulahek, 8 miles north of Tehran, and 3,800 feet above the sea; and the Russians at another village a mile off. Here it is comparatively cool, the thermometer seldom exceeding 90° in the tents.

Climate of Tehran.

Tehran is only a fortnight's journey from London, and the route is very easy. It runs *via* Kasvin, Resht, Baku, Batum, and thence by steamer on the Black Sea to either Varna or Odessa. The Varna route is the quicker of the two, for London is reached in three days in the Oriental express. This train is run by a French Company, and starting from the left bank of the Danube, opposite Rustchuk, runs straight through *viâ* Vienna to Paris.

Route to London.

Another route is the "chappar" route *viâ* lake of Urumiah, lake Van, Erzerum, and Trebizond. A good "chappar" road runs from Tehran to Mashad,

"Chappar" roads.

500 miles; also from Tehran to Kermanshah, 300 miles. From Tehran to Resht the road is passable for carriages, but the common mode of travelling is to ride "chappar" horses to Kasvin, 108 miles, and then take a *droshky* on to Resht, another 100 miles. From Tehran to Kasvin the road is pretty nearly level, running along the south side of the Elburz range. After that the Elburz range is crossed, and the road passes through the forests and jungles of Mazanderan, which extend close up to Resht. This town is one of the most flourishing seaports on the Caspian, and is the chief mart for the silk of Ghilan, in which a large trade is carried on with Russia. Resht is the capital of Ghilan, and one of the most flourishing towns of Persia. The houses are of red brick with tiled roofs; the streets are paved, and the *bazars* are roofed also with tiles. It is 6 miles from the Caspian, and Enzeli is its port.

Road of Resht.

Resht.

The Road from Tehran to Hamadan.

To Ruhbat Kerim 24 *miles.*—On April 7th we quitted Tehran *en route* for Kermanshah and Baghdad, the latter being exactly 500 miles distant. Leaving the town by the Hamadan gate, we entered upon a well cultivated plain, irrigated by numberless *kanats* and streams. The track was broad and good, and by its side runs the Tehran-Baghdad telegraph, a single wire. It was originally erected by English engineers, but has been sold to the Shah, and was in sore need of repair. The poles are of wood, and were seen leaning at all sorts of angles, and often we passed many poles consecutively that had not even an insulator. In these cases the wire either dragged a few feet off the ground, or was supported on iron nails. We rode through many little mud villages, surrounded by orchards, where the fruit trees were in full blossom. At this time of the year, though the sun was hot, it was tempered by many cloudy days, but little rain* fell. Ruhbat Kerim is a large mud village, embowered in orchards, and a stream runs through it. There is a large brick karavanserai and a *chappar-khana*. The country changes now suddenly, and when we had crossed the stream of Ruhbat Kerim, we found ourselves in a stony desert.

Tehran-Baghdad telegraph.

To Khaniabad, 32 *miles.*—After about 10 miles we reached the Shurrud, or salt river. There is no bridge, and we had to ford it. A good deal of fresh water was coming down from the melting snows, and we had to diverge to the right about 500 yards to find a shallow ford. The bed of the river is nearly 200 yards wide at this point, and the banks are lined with sandhills. The river was flowing in several channels, but our ford was not more than 3 feet deep, and we passed without any difficulty. When this river is in full flood, it is impassable, and karavans travelling on this road must make a detour *viâ* Qum. It is the same river that we crossed close to Hasanabad. An enormous desert extends till within 8 miles of Khaniabad, when we entered another fertile valley. We passed immense flocks of sheep and goats, grazing upon the withered grass of the desert.

Ford over the Shurrud.

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* We had only a few showers.

Khaniabad is a ruined village, containing very few inhabited houses; but, owing to its situation in this fertile valley, we were well supplied with the usual food of eggs, bread, chickens, and milk.

To Khushgek, 24 *miles.*—Our route for the first 12 miles continued over this plain, but the cultivation became scarcer; the last 12 miles was over desert, where we saw fresh grass springing up, and thousands of sheep, goats, and beasts grazing. These belonged to the Hiliats, a nomad race, whose little black tents were seen on the desert in several small camps. They were quietly journeying northwards to avoid the greater heat of the southern districts. Their wealth lies entirely in their flocks and herds; but what they cherish more than anything else are their dogs, which nothing will induce them to part with. These dogs are big and very savage, and regard all strangers as enemies. They rival in their intelligence the Scotch sheep dog. We saw some lying, apparently asleep, between the flocks they were guarding and the road. Khushgek is a hamlet built in a small oasis, and concealed behind some rising ground. It has a few gardens, and water is here abundant and good.

The Hiliats.

To Chamarun, 20 *miles.*—A mile from Khushgek we crossed a small stream flowing down a lovely glen. We ascended the left bank. The glen was all cultivated, and abounded in orchards of white blossom and green leaves. The hills all round were rapidly becoming green, watered by the melted snow, which still remained in a few sheltered nooks, and innumerable rivulets flowed down their sides to swell the stream at the bottom of the glen. We passed a little village nestling under the hill, embowered in masses of blossom, varied with the green leaves of the poplar and willow. The road itself is easy, although there are several sharp gradients, and several streams had to be forded; but there is no difficulty anywhere. In several places we saw villagers ploughing the lower slopes of the low round hills. The soil, well soaked by the melting snow, was rich and fertile, and yields abundant crops. A mile before reaching Chamarun, we turned sharp to the left, down a narrow valley, which presently debouches upon a vast plain, backed by snow-clad hills. The country just here is hilly, but not mountainous. The hills are low and rounded, and intersected by numerous ravines, and the soil rich and fertile. There is no karavanserai or *chappar-khana* here, and we were lodged in a cottage, where we were treated with every mark of respect. The principal house of the village is singular. It is a large mud-built edifice, surrounded by a high mud wall, with a circular flanking tower at each of the four corners. It belongs to a colonel in the Persian army, who was absent. The village loafers whom we accosted were curious to know where we had come from, and where we were going. Hearing we had come from Tehran, they immediately asked whether we were Russians. The villagers are poor, but they have a healthy, well-fed look, and their wants are very few. They live on bread and sour cream (*nun* and *mast*).

Fertile country.

To Naobaran, 16 *miles.*—A mile from Chamarun we reached the edge of a rocky gorge, down which a torrent was roaring. On the opposite bank was a

Shallow ford.

broad plain under crops of wheat. Fording the stream lower down, we continued along the right bank for some distance, and then turned westward, over vast undulating downs, now rapidly becoming green. To the south, 5 miles off, are the lofty hills known as Koh-i-Wos, and at their base lie villages and orchards, where apples grow to perfection. Naobaran is a small dirty village. built in a hollow, the downs rising abruptly on both sides of it. A stream runs through the village. The adjacent country is cultivated, and much of the downs had been lately ploughed. If only the country were populous enough, there is no reason why thousands more acres should not be ploughed and yield abundant crops, for the soil appeared rich and fertile, and water is abundant. Whence it will be seen that there is a striking contrast between this part of the country and that lying between Shiraz and Tehran.

Bridge.

To Zerreh, 36 *miles.*—A mile and a half from Naobaran we crossed the Su river, which flows at the foot of the Koh-i-Wos, on a strong stone bridge. The river was 50 yards wide, and partially flooded. The road was very slippery and muddy from a heavy shower that had fallen. The country changed again to-day, aud we rode over wide stretches of hilly and barren downs seeing nothing but two ruined villages. At Zerreh there is a small village and *chappar-khana.*

Flooded road and plain.

To Hama Kasi, 15 *miles.*—To-day we had to ford the Hamadan river, for the bridge had been swept away in the late heavy floods, which had extended for many miles over the level plain through which the river runs. We procured a guide, a young "sarbaz," infantry private, as denoted by a naked rusty bayonet which he wore in his *kamar*, or waist cloth. We followed the road for about 10 miles, having to make frequent detours to avoid flooded and boggy parts. Our guide then turned off the road to the left, and led us across the fields for 4½ miles, which were intersected by muddy ditches full of water, several of which we crossed. Finally, after fording a large expanse of water 2 feet deep, with nearly a foot of mud at the bottom, we reached the *rudkhana* or principal channel. It was 40 yards wide, and the water 4 feet deep; the bottom was muddy, but the current sluggish. It was necessary to unload the mules, and to have the loads carried over by coolies to prevent them from getting wet. These hardy fellows sprang into the river without hesitation, regardless of the icy water and the bitterly cold wind which swept across the plain. With their assistance we crossed safely, and went on to our halting-place, half a mile from the river, Hama Kasi is a small village of the poorest description. The proper *manzil* or stage is Malegao, 3 or 4 miles up the river, and close to the broken bridge.

Ford over Hamadan river.

To Hamadan, 28 *miles.*—Five miles across the plain, gradually ascending, brought us to the foot of the low rounded hills that bound the valley we had crossed on the west. Numerous flocks were grazing, and we noticed that nearly all the shepherds were armed with curious long guns, which they slung over the shoulder. Robbers are said to frequent these hills, but we

Armed shepherds.

Bridge.

met none. We pursued our way without adventure for seven hours across the uplands, and then descending reached the village of Surkhabadi on a river of same name, crossed by a substantial brick bridge. The river was low, but is liable to sudden floods. Another hour's march brought us to Hamadan.

HAMADAN.

Description of Hamadan.

Hamadan is a town of about 15,000 inhabitants, situated at the foot of Mount Elwend on its eastern side. It is an exceedingly prosperous little town, but the streets are narrow and peculiarly filthy; many of them were fetlock deep in the black mud. The plain, which stretches in a general north and south direction, and is 4 miles wide, is one of the most fertile we had seen. It teems with fruit trees and crops of all sorts and is watered by many streams from Mount Elwend.

Missions.

Schools.

Jews.

Esther's tomb.

Bazars

Fruit.

Climate.

Many small villages are scattered about, and marvellous to relate, we saw no ruins. It is literally "a land flowing with milk and honey," for quantities of both are procurable. There is an American mission and dispensary here, and English speaking natives are met in the streets. The population is mixed. There are between 3,000 and 4,000 Jews, and 35 families of Armenians; the latter furnish 80 school children, some of whom are well advanced in English. The Jews are wealthy, and include in their ranks many gold and silver-smiths and dealers in old coins, which they manufacture to a great degree. They have their agents in Tehran and Baghdad, where their goods are sent for sale. Besides the counterfeit coins, many genuine old coins are dug up round the town. In the Jewish quarter of the town is what is said to be Esther's tomb, called Kabr-i-Mordekai by the natives. Formerly thousands of Jews used to perform pilgrimages to this shrine, but of late years their numbers have fallen off. The *bazars* are good, partly of brick, arched over, and partly built with pointed wooden gables. There were many leather workers and saddlers, which are the *specialité* of Hamadan. The bread here is exceptionally good and quantities of apples and honey were on sale. Bees are kept at Sahna, and also at Hamadan. Flour here is good and cheap. In the plains, plums, cherries, peaches, apricots, pomegranates, and apples grow very well. There are also large vineyards, and the wine of Hamadan is as good as that of Shiraz. The plain is 6,000 feet above the sea, and the climate temperate. Snow falls from Christmas to February, but the cold is never severe; while in the summer the thermometer rarely exceeds 85° Fahrenheit in the houses. The locality is healthy, and the American missionary assured us there was but little fever. He had been there five years.

The Road from Hamadan to Kermanshah.

Bridge.

Difficult pass.

Saidabad.

To Saidabad, 24 *miles.*—We now turned due north up the valley for 7 miles. The country was all richly cultivated, and watered by streams which poured down the hills on our left. Everything was bright and green, and grass grew abundantly at the roadside. Our road then turned westwards, crossing the northren spurs of Mount Elwend. It was bad and stony, but not very steep, and was treacherous in parts from the soaking it had received from the melting snow. Three hours more steady marching over grassy ridges and valleys brought us to a deep and rocky gorge, between whose precipitous sides a mountain torrent poured. We crossed on a rough bridge of brick and stone, and ascended the left bank. The further we went, the worse the track became. The snow, which lay in large drifts blocked up the pass. It was too soft to afford a firm footing, and so we had to scramble along a goat path, a foot wide, which ran along the face of the steep cliff. The soil was shingly, and nothing but an experienced mule or pony of the country would have attempted the path. A steady ascent of 2½ hours through this winding defile brought us to the top, and the broad and populous vale of Saidabad was seen many hundred feet below us. The descent is abrupt and steep, and took us ¾ hour to accomplish. Saidabad is merely a small village and mud huts, with nothing but a good water-supply to recommend it. It is 2 miles from the foot of the hills. We were now out of the country of the *kanats*; streams provide an ample water supply. The last *kanats* we saw were at Khaniabad.

Populous plain.

Bridge.

To Kangavar, 21 *miles.*—Our road now lay south-south-west over the plain, which was covered with a pasture land of a brilliant green. Many flocks and herds were grazing, and we counted as many as thirty villages. A deep sluggish stream, 60 feet wide, flows through the plain, which we crossed 10 miles from Saidabad on a ruined brick bridge; the parapet had disappeared, and the roadway was worn and broken away at the sides. We passed amongst some low hills at the end of the plain, and entered another long plain, in which was Kangavar. The village is of a better class than most, and, besides a good karavanserai, has several well built houses of brick, and is surrounded with vineyards. There are a few provision shops, which constitute a small open *bazar*, where dried raisins of all sorts and sizes and *chibouks* seemed to be the stock in trade.

Hiliats.

To Sahna, 20 *miles.*—We now crossed an expanse of rolling downs, with a range of hills on our right. We passed many Hiliat encampments, and thousands of flocks and herds. These people are a simple and honest race, and very hospitable. In former days the flower of the Persian cavalry was recruited from them. One man with whom we spoke said he had lost many sheep from the recent severe winter. They are a hadsome race, both men and women. The latter do not cover their faces. Crossing the low hills on our right, we descended into a narrow valley, in which lies Sahna. This valley consisted mainly of land under plough, though many flocks and herds grazed on the slopes of the hills. The road was bad and stony all the way from Kangavar, but presents no difficulty.

Sahna.
Vakil-ul-Dowlah.

On arriving at Sahna, we found the servants and horses of the Vakil-ul-Dowlah, the British Agent at Kermanshah, which had been sent to meet us. Sahna is a very picturesque little village ; it lies at the foot of the hills, from which flows a considerable stream. It is almost hidden in orchards of plum, cherry, apricot, and apple trees, besides many vineyards, planted with small standard vines. The country is now at its best ; when the heat of summer sets in it will lose its freshness, and the grass will wither.

Gurmasiab river.

Bridge.

To Bisitun, 16 *miles.*—Next morning we set out on the British Agent's best Arabs. We rode along a path through ploughed fields, bounded by lofty crags for 6 miles when we reached the bank of the Gurmasiab river. This river has a broad sandy bed, and flows in numerous channels. The lofty crags that tower above Bisitun were now in front of us, and between us and them lay a vast pasture, many miles in extent, and covered with rich grass, studded with daisies and dandelions. Close to Bisitun we crossed a snow stream that flows into the Gurmasiab on a lofty brick bridge resting on stone piers. At Bisitun there are only a few mud huts and a fine karavanserai and *chappar-khana.* Here we found the British Agent's carriage awaiting us, and we went on at once in it. The road was not metalled, and was rough for a carriage, so our driver took us across the open plain at the side of it. The country now changed to an undulating barren waste, with hills close by on our right, and a gradual dip down to Kermanshah. It was here that we passed the escort with the robber's heads (*see* page 227).

Bridge over Kara-Su river.

To Kermanshah, 24 *miles.*—Three miles from Kermanshah we crossed the Kara-Su river on a good brick bridge, and here we were met by Haji Abdurrahim, the British Agent's eldest son. He had come to perform the ceremony of "istakbal" or receiving and meeting guests. Another carriage awaited us, and we proceeded escorted by twenty outriders to the town.

KERMANSHAH.

Description of Kermanshah.

Trades.

Kermanshah is a large town, and from its position on the frontier has considerable commercial importance. The *bazars* are large and well built of brick, and were densely crowded. Carpets form the *specialité* of the traders, and are maufactured in large quantities in Kermanshah and the neighbourhood. In addition to carpets, much trade is carried on in silk. There are also many leather workers, silversmiths, goldsmiths, money changers, Manchester and Birmingham wares, and countless

Agha Hasan, Vakil-ul-Dowlah.

His wealth and influence.

provision shops. The British Agent is the chief trader in the town. His full name and title is Haji Muhammad Agha Hasan, Vakil-ul-Dowlah. His wealth is enormous, and, being under British protection, his money is all secured to him; that is to say, the Shah cannot levy contributions from or impose fines on him as he does on other rich Persians from time to time. Wealth is truly power in Persia, and the Vakil-ul-Dowlah's influence is paramount in Kermanshah, and for 100 miles either up or down the road. The governor consults his wishes on every point of importance and can do nothing without his co-operation. The *bazars* are adorned with four large and handsome karavanserais built during the last few years by the Vakil-ul-Dowlah. The largest cost 20,000 *tomans* (£6,000). Here the principal merchants store their wares.

Agha Hasan, as he is generally called, owes his prosperity to Sir Henry Rawlinson, who brought him as a young man from Baghdad, and made him the Agent to the Minister at Tehran. He is a kindly and charitable man, and much beloved by all his dependants, while to all Europeans he displays a boundless and impartial hospitality.

He is a remarkably able and well-informed man, and reads with interest a variety of newspapers, including several English ones, which his son's tutor, a Persian, translates to him. He is acquainted with all the leading topics of the day, and as regards English politics is a staunch Tory.

Situation.

Kermanshah is situated on the western side of a splendidly fertile plain, 5 miles wide, and bounded on the east by the rocks, in which are the famous sculptures known as Tak-i-Bostan.

Kara-Su river.

Barracks and troops.

The plain is watered by the Kara-Su, a river averaging 50 yards in width and unfordable. On the rising ground behind the town are many gardens and orchards, watered by numerous streams. In the town are some large brick barracks enclosing a large square. They stand in need of considerable repairs, and are beginning to shew signs of age. A good many soldiers were loitering about. We passed a guard, and the sentry brought his rifle smartly to the "sling" as we passed. The soldiers were fine looking men, and fairly well set up for Persians. Their uniforms were in rags. There were four regiments of nominally 800 men each in the town and neighbourhood. They had just returned from a successful expedition against some large bands of robbers that infested the road to Baghdad. The governor had accompanied them in person, and had been rewarded by the Shah with a "sword of honor."

The Road from Kermanshah to the Persian Frontier.

Hiliats.

Mohidasht, 15 *miles*.—Leaving Kermanshah, we turned westwards once more, and entered the low hills at the back of the town. The road was bad, and covered with loose stones. We passed many Hiliats marching up-country to graze their flocks and herds on the slopes of Mount Elwend. Their tents and goods were packed on the backs of bullocks and cows, and they—men, women, and children—marched beside them. The men were of splendid physique, of middle height, and with fine muscular limbs, and ruddy in complexion. At Mohidasht there is a very fine brick karavanserai and a few huts, and a good water supply in wells. The village is situated in a plain.

Harunabad, 20 *miles*.—The road traverses alternate low ridges and plains, covered with grass, where thousands of sheep and goats were grazing. We passed a small mud village in a plain, where the owners of many of the flocks and herds lived. Women at once came out, and offered capital bread, milk, and sweet butter for sale. The sun this day shone very fiercely, and the water in the various streams was quite warm.

Persian colonel and soldiers.

Harunabad is a small half ruined village. We found a Persian colonel and a few men quartered here. The colonel said he had 1,000 men, but his regiment was probably drawn on the liberal scale in which he described the Persian army, *viz.*, 300,000 of all arms. They had some Martini-Henry rifles, for which they paid from 25 to 35 *tomans* (from £8 to £12) a piece. The men we saw hanging about seemed an undisciplined lot of ragamuffins. The colonel wished to give us an escort of fifty troopers, which we declined.

Kerrend, 20 *miles*.—The road follows the plains, which wind amongst the hills that are on both sides. The hills are here sparsely covered with bushes, which serve as firewood. Many flocks and herds were seen grazing. The latter part of the road was much cut up with boggy patches, caused by streams flowing from the hills on the right, and here pastures gave place to plough land. Kerrend is one of the most picturesque places we had seen.

Fertility of Kerrend.

Vineyards, &c.

It lies on sloping ground at the foot of the hills, out of which issues, through a narrow chasm, a beautiful stream. There is an upper village also, the houses of which are clustered about the mouth of the chasm. A high grassy mound commands the village, and affords a fine view of the country. The ground slopes down on both sides to the river, and is arranged in terraces for facility of irrigation. Vineyards and orchards abound. The plain beyond was green with young crops, alternating with patches of brown ploughed land. As a background rose a rocky range of hills, still streaked with snow. The vineyards were full of labourers, and an air of life and prosperity pervaded the entire village. Excellent water and bread is obtained here, and there is a large karavanserai, apparently not much used. The natives in this part of Persia are much more civil than those we met on the Shiraz-Tehran road. They never passed us without the usual "salaam alaikum." Not more than four or five Europeans on an average pass this way in the course of the year.

Natives.

Long defile.

To Sarpul, 25 *miles*.—Three miles from Kerrend the hills close in on both sides, and the level plain becomes a narrow rocky gorge, full of holm oaks and hard thorn bushes. The rugged cliffs rose 1,000 feet above us, and in the bed of the ravine was a stream. The road was as bad as the roads over the passes between Bushire and Shiraz; large stones were strewn so thickly we could only travel at the rate of two miles an hour. We passed many parties of Hiliats marching eastwards, and several encampments on the banks of the stream.

They had some very good looking brood mares, ponies, and horses, and a few mules. We continued through this defile for 4½ hours without any variation in the road or its surroundings. We then reached another ravine, ¼ mile wide, which ran up from the plains on the left, at right angles to the defile. Our road ran straight up to the edge of this ravine, which was many hundred feet deep, and wound down the sides of it by a series of zigzags.

Descent from Central Asian plateau to the plains.

At this spot the road descends from the highlands of Persia to the low ground of the valley of the Tigris. We descended about 2,000 feet in about a mile, and at the bottom there was a marked increase in the temperature. The remainder of the road was level and easy. We crossed undulating plains, which a month before had been desert, but were now covered with rich grass, and brilliantly colored with daisies, poppies, and buttercups. Sarpul is a small village on the right bank of a river of the same name, which we crossed on a fine stone bridge. There is a very fine karavanserai here, where a captain and 100 men were quartered. A guard of three men were placed over our quarters; the men piled their arms, but did no "sentry go," and wandered about as they pleased. Provisions here were good and abundant—goat's milk cheese (*mast*), *dogh*, figs, walnuts, bread, eggs, and milk. Close to the karavanserai was a brick building, where we saw three brass field guns.

Persian sentries.

Persian escort.

Reliefs.

Jawan Mir, the robber chief.

To Kasr-i-Shirin (commonly called Kasr), 16 *miles.*—It was on this part of the road that robberies had been so frequent; and though they had all been dispersed, the captain made a great fuss about supplying us with an escort. We accordingly started with 15 men and a sergeant. The men were dressed in cotton tunics, worn open, and various coloured trousers—blue, white, and white with red stripes. They were armed with muzzle-loading rifles, and others with Russian breech-loading rifles; but the former were all removed when the escort was inspected, and the required number of breech-loaders was made up. The men were small, wiry fellows, quite undisciplined, and marched along in loose order, talking incessantly. The road was stony and monotonous, the surrounding country desert, broken up with hillocks and watercourses, where any number of robbers could lie in ambush. Every 4 miles we passed a round tower, where our escort was relieved by a similar number of men. We reached Kasr without any adventures. Here were the head-quarters of Jawan Mir, the robber chief. He occupied a small square fort of stone on a mound which commanded the village, whence the Government troops dislodged and killed him. The Sarpul river flows pass the fort, and many of his followers were drowned in attempting to cross it. The village is small and filthy, and there are many rush-built hovels that mark the existence of Arabs among the inhabitants. There is no karavanserai.

Persian *sowars*.

To Khanakin, 20 *miles*.—This day we crossed the frontier from Persia into Asiatic Turkey. Rain had fallen during the previous 18 hours, and the road was fetlock deep in slippery red mud, which rendered it all but impassable. The country was similar to that we passed through the previous day. We had an escort of twenty *sowars* or troopers. They wore no uniform. They were armed with Russian breech-loading rifles, and carried twenty rounds of ammunition in a belt. Their horses averaged 14 hands and half an inch, and, though small, were very useful looking, wiry animals, and the men could all ride well, as every Persian can.

Perso-Turkish frontier.

At noon we reached the frontier post, a round brick tower on a ridge, garrisoned by twelve Turkish irregular soldiers. Five miles further on in the desert is Khanakin.

Khanakin.

Turkish officials.

No sooner did we reach the outskirts of Khanakin than we were made acquainted with the complex officialism that obtains throughout the Ottoman dominions. We were taken to the quarantine building, where we had to pay the usual tax of half a *medjidieh* (1*s*. 8*d*.) on every person entering Turkey. A captain and two file of men escorted us to our quarters, and then the custom-house official arrived and searched our baggage, which they offered to omit doing for a small bribe, and a police officer came and demanded our passports.

Turkish battery.

There was a garrison of a battalion and half a battery in Khanakin. The guns were of the Krupp pattern, and were kept clean and bright. The horses were stout little greys, and looked very serviceable. The men were camped in neat bell tents; and, in short, their general appearance was highly creditable. Khanakin is a small town on the Sarpul river, surrounded with date groves, mulberry, and other fruit trees. The houses are chiefly of mud, and there is a small and dirty *bazar*. Hence to Baghdad is four stages; and the Arabs measure the distance in hours, one hour being equal to three miles:

Kizzil Ruhbat	5 hours,	15 miles.
Shahrban	5 ,,	15 ,,
Bakubah	8 ,,	24 ,,
Baghdad	10 ,,	30 ,,
		84 miles.

The road passes through desert, varied with patches of cultivation. The Sarpul river is forded at Khanakin, and at Bakubah the Dialah river is crossed by a bridge-of-boats. Between Bakubah and Baghdad is a level sandy desert. Half way there is a karavanserai and coffee house, where brackish water is obtainable.

THE PERSIAN ARMY.

The Shah has to thank his corrupt ministers for the miserably impotent character of the army of the present day. It seems extraordinary that these men are descended from the heroes, who, under Nadir Shah, Result of efficient training.

expelled the Afghans from Persia, captured Kandahar and Kabul, and overran the plains of India. Yet I doubt if the rank and file have altered so much as the officers. In modern times we see what the Persian soldiers can do when worked up to a state of efficiency. In 1826 Major Hart had commanded the Persian infantry for upwards of 20 years, and to him is due the credit for the brilliant commencement of the war with Russia in that year. His men were properly fed, clad, and paid, and he had gained more of their respect and love than almost any other Englishmen has done. He was liked none the less for the strict, but impartial, discipline which he preserved.

Rank and file.

Their endurance.

Mobility.

Result of reforms by a minister.

There can be, therefore, but little doubt that the material of the army is good. The men are small, active fellows, with iron constitutions, inured to fatigue and exposure. They bear with equal fortitude the cold of winter and the heat of summer; only in the latter they are easily knocked up if they cannot obtain an ample supply of water. Half fed and half clad they can march 25 miles day after day, and more if necessary. Nearly every man possesses a donkey, on which he places his arms and small kit, thus much increasing the mobility of the regiment. Naturally of a somewhat turbulent disposition, the Persian will submit entirely to an officer in whom he can place confidence. Such a commander was the great Nadir Shah, and such was the late Wizir Teki Khan, who carried out many reforms in the army. He caused the men to be well fed, well clothed, and well paid, the result being that they were extremely attached to him, and would have followed him anywhere. Jealous intrigues, the curse of Persia, induced Shah Nasr-ud-din to have him murdered, and the decline of the Persian army dates from his death in 1852.

The private's pay.
Peculation.

Employment as labourers, &c.

Nowadays peculation of the most flagrant and barefaced character prevails. The wretched private is paid about 7 *tomans* a year (£2-2-6), of which, perhaps, he receives half. A man cannot live on this even in Persia, or on the small ration of bread which is issued to them. To make up the deficiency, the poor fellows are glad to seek employment of a civil nature, and are to be seen building walls, working in the fields, and carrying loads in the *bazar*. All the butchers in the capital and other large towns are soldiers. As we entered Tehran we met many of them returning from drill to their various avocations.

Appearance of the men.

They slouched along with a sullen hang-dog look on their faces, as if ashamed, as they had good need to be, of their appearance. They were dressed in ragged, ill-fitting uniforms of an Austrian pattern made of the coarsest canvas. The belts shewed an absence of either pipe-clay or blacking. When they parade before the Shah, they are served out with a smart suit each (without, however, any attempt at fitting on), which is returned to store when the

Austrian and Italian "instructors."

parade is dismissed. Barrack discipline does not exist; they come and go when and where they please. They are supposed to be drilled and disciplined by a few Austrian and Italian officers, who seemingly do not think it worth their while to do their duty.

The officers.

Incapacity.

Honorary commissions.

The Persian officers are very different to their men. They are an unreliable set of cowards and thieves. Cowards inasmuch as they run away from their enemy, and thieves in that they steal their men's pay and defraud the Shah. They owe their position, not indeed to any personal fitness for it, but to their individual capacity to pay enough bribes to satisfy the cupidity of those who have patronage to bestow. Generals and colonels are born. Men of humble origin cannot aspire beyond the rank of major. The officers care little for their men, and are despised by them. Of military duties, the majority of them know next to nothing; they have no dignity, and no idea how to treat their subordinates. Good officers make good men, and *vice versâ*. Honorary commissions are much in vogue, and those who can pay may become captains, majors, &c., although they be in no way connected with the army. For example, most of the Persian telegraph *employés* are majors or captains. This honorary rank has its advantages, as the holders of it are exempt from petty extortion, fines, and annoyance at the hands of the local magnates. No one but the Shah himself can ill-treat them.

Anglo-Persian war of 1857.

Flight of the Persians.

Bribes.

The worthlessness of the Persian officers, the corruption of the ministers, and the pitiable gullibility of the Shah are well illustrated by an incident of the Anglo-Persian war of 1857. After the defeat of 13,000 Persians by 5,000 British troops at Mohammerah, General Outram sent a body of 300 British in pursuit. Five days later this small force came up with the Persian army, 10,000 strong, including 2,000 of their best cavalry. On the mere approach of the handful of British, the whole Persian army took to their heels, and fled. A few well-directed shells completed their confusion. The colonel in command of one regiment, who was able to pay a heavy bribe, escaped punishment. Prince Khanlar, the general, paid a bribe of £8,000 to the Sadr Azim prime minister, in return for which the Sadr Azim recommended him favorably to the Shah, who presented him with a sword and robe of honor. It is the unfortunate subordinates who have to suffer for their leaders' cowardice and incapacity. It is hard on the Persian soldier to have to fight under such officers.

Russian Military Mission.

Persian Cossacks.

The Russian Military Mission is busy at Tehran. Its members are Colonel Karavief, Captain Minief, and Captain Blumer (the last is English on the mother's side). The two first have raised a smart regiment of cavalry dressed as Cossacks. We made the acquaintance of these officers, and we were invited to see some regimental sports in honor of the Nao Roz festival. We rode out on the

Horses.

Equipment.

Shemran plain, and presently the regiment was seen approaching. They marched in sections, and looked a remarkably serviceable body of men. They were 400 strong, and mounted on wiry little Persian horses, showing a great deal of Arab blood, and in excellent condition. The men were dressed in lamb's wool caps, the long black Cossack great-coat, secured by a thin strap at the waist, long black gaiters, and shoes. Instead of spurs, they each carried a short whip in the waist belt. They were armed with swords and rifles, and each man of course carried the Cossack dagger. They performed several feats, such as lemon cutting, picking a cap off the ground at full gallop, firing at full gallop, &c., with moderate precision. They have a band which played European music really well, and a French band-master. Most of these men have private means, and each must provide his own horse, uniform, and sword. Government supplies the rifle. They take a great pride in their appearance—very different from the poor infantry man—and are constantly seen in the streets stalking about on foot, or riding at full gallop. Such might be the whole Persian army under English or Russian management. Reforms executed by a Persian minister are never given credit for disinterestedness, and result, as in the case of the good Teki Khan, in his downfall. Russia has now inserted the thin end of the wedge into the Persian army, and can afford to bide her time for driving it home.

Strength of the army.

Paper army.

Fraudulence of commanding officers.

As regards the strength of the Persian army, it is difficult to form an estimate. I was informed by an Englishman in the Shah's employ that pay is issued by the Shah for 80,000 infantry and 60,000 cavalry and artillery, but barely half of these troops have really any existence. The balance is seized by the corrupt ministers. Whether the Shah is aware of this is doubtful. He remains in his capital, or leaves it only to shoot in the Elburz; and so long as he sees soldiers there, he is satisfied. As an instance of the peculation of commanding officers, the following is told, and its truth vouched for. The Lashkar Nawis Bashi went to inspect a regiment at Mashad prior to issuing pay. The commanding officer drew pay for 800 men; he however, only had 400, and to make a show for the day, he hired 400 pilgrims, and dressed them up in spare uniforms.

Such is the Persian army.

THE GOVERNMENT AND THE PEASANTS.

Government of the country.

System of farming.

Agha Hasan, the British Agent at Kermanshah, remarked: "The government of the country is miserable; it is made up of tyranny and lies." Living, as he does under British protection, he is in a position to give an impartial opinion. The system of "farming" provinces and towns obtains throughout Persia. When the governorship of a province becomes vacant, it is put up to auction by the Shah, and sold to the highest bidder. The purchaser then takes possession, and turns his attention to reimbursing himself for his outlay by a series of taxes and fines imposed on the poor *ryots* of his province. The taxation falls almost entirely on those least able to bear it—the peasants, shopkeepers, and artificers. The first pay 25 per cent. of their earnings ; the last two classes about 20 per cent. The governor, however, if he is thought to be making money too fast, is often ordered by the Shah to make a handsome donation into the exchequer.

The peasants.

Notwithstanding all this cruel oppression, most of the peasants are contented people ; they are well clothed and fairly housed, and their habits of life are so simple, that their staple food of bread, cheese, and sour milk is within the reach of all. Tobacco also is very cheap, and the Persians are great smokers. Their houses are generally of mud, but most of them have a few "namads" and strips of carpet, which add to their comfort. The men are a very handsome race, active and industrious, and under a better government agriculture would flourish in their hands. The want of water in Persia will ever prevent it from being a populous country.

Population—Trade—Exports, &c.

Population.

Fertility of soil.

The population has been variously estimated, but the most probable figure is between four and five millions. The wonderful productiveness of the soil wherever it was watered could not but strike us, the contrast with the desert being so marked, one can as a rule step in one stride from a rich cornfield on to the sterile wilderness. It is customary for any man who is the first to bring any desert ground under irrigation to become the absolute proprietor of that ground.

Merchants and trade.

Under such a corrupt and oppressive government, the merchant's life is an uphill one. He must be careful not to make any show lest he be marked at once as a rich man, and made to contribute large sums to the royal exchequer. He should also not be too prompt in meeting his monetary engagements lest for that reason he should be marked in the same way. A rich man is always in danger in Persia.

Exports, &c.

The principal exports are raw silk, cotton, wool, horses, and tobacco, and the imports Manchester goods, tea, sugar, firearms, glass, &c. If only the roads were improved, these exports might be greatly extended. At present everything is carried on mules and camels.

Mules and the absence of roads.

Mules.

It has been estimated that 2,500 mules ply regularly between Shiraz and Bushire alone. They frequently make this journey, 180 miles, in 5 days, which, considering the abominable roads and the difficult passes, is good travelling. The mules are splendid animals : they average over 13 hands, and a large proportion of them reach 14 hands, and some even more. They are accustomed to carry loads of from 250 to 300 lbs. weight over these hills, which they accomplish with ease. Their food is chopped straw (*kah*) and barley (*jao*). All that we passed looked in excellent condition; but, of course, a few sores are inevitable. They will travel on level ground about 3½ miles an hour.

Absence of roads.

If only roads and carts were instituted, the amount of mule power that might be saved can easily be imagined. Even one good road, say from Shiraz to Bandar Abbas, would serve to tap the trade of the country far better than can be done over the rocky passes of the Bushire route. The Shah has been urged to this many times, and his consent has even been gained to road-making; but he is so much in the hands of the ministers, that the schemes have fallen through. Only around Tehran are there a few roads, leading to some of the Shah's palaces and gardens, and also from Tehran to Resht; but this we did not see; it is at any rate passable for carriages.

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Ignorance of the Shah.

Unfortunately for the country, the Shah does not appear to know its real condition. There are not wanting those who would acquaint him with its true state, but they have no opportunity of doing so. Whenever an audience is granted, ministers are always present, and so it appears impossible to open his eyes. One or two instances of the deception practised on His Majesty will suffice.

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(i) *The road from Qum to Tehran.*—The Shah imagines it to be a good metalled road, and at any rate passable for carriages. Its real state is as I have described it above. Near Tehran it was in some places so boggy that we had difficulty in passing on horseback. We were travelling with an Englishman in the Shah's employ, who remarked: "If the Shah knew what this road was like, he would soon have the minister's head cut off."

(ii) When Sir Peter Lumsden returned to England *viâ* Tehran from Mashad, post horses were collected from several places, and posted along the road in addition to those already there. The Shah enquired of Sir Peter whether he had found plenty of horses along the road, and was delighted to hear that the line was so well organized that ten horses were available at every stage. This he imagined to be its normal condition. Should the Shah declare his intention of inspecting any portion of his dominions—as, for example, the road to Qum—the ministers would have no difficulty in postponing his visit by declaring the opportunity was not favorable. The Persians' belief in the influence of the stars for good or evil is well known. Meanwhile the road would be put into repair. So His Majesty never

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THE REAL *versus* THE IMAGINARY BATTLE.

BY

CAPTAIN NORMAN BRAY, *2nd Battn. Royal Inniskilling Fusiliers.*
Offg. D. S. O., Secunderabad.

Introduction.

Speaking at the Royal United Service Institution in 1884 Lord Wolseley said :—

"I cannot help thinking that all the armies of the world, certainly our own, have always reversed the order in which drill ought to be taught. Our notions as to what a battle ought to be seem to have come down to us from prehistoric times almost. We then apparently set to work to create a system of drill to meet the circumstances and exigencies of this imaginary battle. My view of drill would be exactly the reverse of that process. I would first of all read the books written by others who have great experience of what has taken place and what does take place in every action. I would first find out exactly what it is, what an action is, from the very first moment a shot is fired until the position on either side is stormed and taken. I would find that out, find out what the duties of a private soldier really are and having thoroughly arrived at that conclusion then work back from that to the goose step."

* * * * *

I was much struck on reading these very common-sense remarks and at once set to work to act on the advice given, but found it far easier said than done.

Map in hand I read the Prussian official account of some of the early battles in 1870 and I was left with a very clear notion of the course of events, but much as they taught me I could not sit down and draw a faithful picture of a modern battle. Human beings had been fighting and marching and getting killed, but one must look more behind the scenes to try and realize their feelings and individual actions. Day after day I sat down and tried to write a clear impression of what I had learnt and again and again I failed. Somehow the mainspring seemed to be wanting, the usual wheels of tactics went merrily round, but the motive power which forced those tactics was not apparent to me. Colonel Lonsdale Hale then lent me the Regimental Histories of the 4th Prussian Foot Guards and of their 8th and 50th Infantry Regiments, the latter written by the well known von Boguslawski. One must not depend too much on such narratives, but at any rate they draw a faithful picture of what perhaps they would gladly hide, namely, the results in a real battle of a peace training for an imaginary one. I still feel I have failed to draw the picture I would like of a real battle as left on my mind by these works. They are so brimful of incident, so bristling with proof of how unlike the real is to the ideal battle, that any attempt to shorten their story must be tame and incomplete compared with the original. But in every line they show not the advisability but the absolute necessity of following the principle contained in Lord Wolseley's remarks.

I choose the early battles of 1870 advisedly because we find the Germans stepping into action after having been carefully trained for an imaginary battle very unlike the real ones they were to take part in and the reception they met with is most instructive. But it will first be necessary just to glance at that peace training between 1866 and 1870 to trace the ideas with which they entered on the campaign.

Patient hard work, discipline, education, patriotism, and in a lesser degree a good weapon, had triumphed in 1866 over tradition, ignorance and a want of national feeling. But the thinkers in each arm saw many and serious faults in their tactics altho' they had been victorious.

Perhaps the most sweeping reforms of all came to the artillery. A rugged old soldier, foreseeing an early death from heart disease, longed first to see the fulfilment of an all absorbing idea. Von Hindersin foresaw the coming struggle for German unity and, as he told the Emperor, felt that in a decisive battle the result might hang on the efficiency of the arm for which he was responsible and that he could not sleep at nights till he saw his way more clearly. Rifled cannon were introduced, a school of gunnery was formed on the English model and he told his batteries that drill and polish were all very well but that they were useless till they had learnt to shoot.

There was further among the artillery a wide spread feeling that they had failed tactically in 1866 and that the place for the then called reserve artillery was not in rear of a column going into action.

In the infantry a bitter paper war had been waged. It was found that the three-rank battalion columns, which the old school considered the main stay of Prussian discipline in action, had naturally and of necessity dissolved themselves into a thinner formation. Floods of pamphlets appeared suggesting means for preventing this in future. Late in 1869 an anonymous one appeared, whose writer could exultingly exclaim "Now we are independent of theory, we have seen, seen with our own bodily eyes, the reality." It contained the startling theory that this very thinning out was not a thing to be discouraged, but that it was a necessity, and that the object now was to introduce as much order and method as possible into this apparent disorder.

Authority did not adopt this idea, on the contrary, contradicted it in a semi-official pamphlet, which must be looked on as a considerable historical curiosity by its author the present War Minister of the German Empire who has just issued the new German drill book which out-Herods Herod. The not altogether illogical conclusion that the authorities had come to as to the great value of the breech-loader was: that whereas with the old weapon it was necessary to extend a section in skirmishing order, now half a section could do as much execution; and this idea was emphasized at all inspections. "Gentlemen throw out very few skirmishers, only one half section, that is now as efficient as a whole section was formerly. Let all the rest be kept well in hand."

All three arms had written themselves into a state of mutual jealousy which was to bring about both very good and very bad results in 1870.

In England where such jealousies are merely social their importance is under-estimated.

The Real Battle. An Infantry Combat.

Now let us follow von Boguslawski's description of the doings of his regiment at Worth.

On the eve of Worth the 50th Regiment were on out-post duty from the Füchshübel to Gunstett. All the officers and non-commissioned officers had been told that no fighting was to take place on the 6th and were therefore surprised to see the fight commence.

About 10 A. M. the 1st and Fusilier Battalions were ordered to cross the Sauer, an insignificant obstacle when not in flood; but when flooded, as it was on the 6th August 1870, it was 6 or 8 feet deep and 20 to 30 yards broad.

The 2nd Battalion who since dawn, had been fighting round Gunstett were ordered to guard the river passages at that point. The 1st Battalion advanced in company columns towards the Galgenhübel. The Fusilier Battalion just touched Spachbach with their left flank, two companies in first line, two in second.

They were soon stopped by the Sauer, whose swollen condition made it quite unfordable in most places. Only one company could ford it up to their necks in water, the others improvised foot bridges with the long stout hop poles used in that part of the country, which could only be crossed very slowly and several men fell off and were drowned.

During the crossing the French batteries, which had at first withdrawn from the Prussian guns, reappeared and fired at the companies standing uncovered waiting to cross. The men however soon gained confidence when they found that in spite of the great noise few shells hit their mark. More serious was the Chassepot fire which could not be returned, especially when crossing the water and meadows beyond. The men saw this and did not fire, but each company as it got over ran across the thousand paces of open meadow and threw themselves into a ditch on the high road which winds round the foot of the Galgenhübel. Already the situation began to be unpleasant, a well posted army in front, a swollen river behind.

The first company reached the ditch long before the others had crossed and, doubtless thinking that the Galgenhübel was unoccupied and that he would make the operation of crossing safer, the captain led an isolated charge against it and reached the crest line, but a counter attack drove it back with terrible loss and the captain fell pierced by seven bullets. As von Boguslawski says:—"The brave von Burgsdorf carried with him to the grave his reasons for this bold attack." It was more than an hour before the crossing was completed, and when all had gained the high road the field officers wished it to be held till reinforcements came, but all command was impossible and isolated groups advanced to attack the Galgenhübel without orders. No one could hear a word of command but several officers ran forward and the men followed. With great loss the crest was gained and the French retired, but soon made a counter attack supported by artillery, which latter hit four officers, and the men again bolted back to the high road where the officers stopped them and the pursuing French were also stopped. For two hours some officers try to form closed bodies from the long mixed up line which were at once scattered again. Others, followed by 40 or 50 men each, dash up to the crest and take it for a minute till a counter attack again drives them back to the high road, not straight back but wedged outwards, and so mixes them up more and more. The ammunition begins to fail and the dead and wounded are ransacked for more. No re-inforcements come. Only the long line of guns send shell after shell over their heads whose effect they cannot see. The major walking coolly along the line begs the men to hold out, a bullet goes through his helmet as he is talking to a sergeant; he takes it off to feel for the wound and a bunch of hair falls out, he laughingly replaces it and continues his conversation. This little incident calms the men wonderfully but as von Boguslawski says, it is a hellish situation. Half the men and more than half the officers are down, no command is possible, ammunition short and a vigorous counter attack momentarily expected. But every one felt he was helping to play a great game of containing the French centre whilst the turning movement developed itself.

At one o'clock help arrived and the 17th Brigade was seen marching down to the Sauer.

But their crossing was also very slow and meantime it was noticed that the French fire was slackening. They had retired before the awful fire of the long line of guns. And as so often happened in this war, the men *instinctively* dashed forward and gained the crest without orders. All the buglers were down but an officer blew the "advance" to let the 17th Brigade know what had happened.

Again the French made a vigorous counter attack and this time drove the 50th over the high road down to the river. But here and there groups stood fast and, together with such of the re-inforcements who had got across the Sauer, stopped the pursuing French and overwhelmed them with fire as they retired. The crest was gained again and twice the French made counter attacks but now the Prussians were too strong for them and advancing by the "leap and hold" method, they seized fold after fold, beat off counter attacks, and were not checked till they reached the hillock in front of Elsasshausen. During the advance the divisional commander was fighting in the front rank like a grenadier. It was all he could do, all his command was scattered over a mile of country, his last reserve was in first line and all he could do was to set an example of pluck and dash. Thus as May pointed out after 1866, some companies had no officers, other groups were led by half a dozen field and general officers.

The men were hopelessly mixed up and no well organized attack could be made till an adjutant ran to the front and called out, "All men with yellow shoulder straps (the distinguishing badge of the Vth Army Corps) form round me."

He collected three good sized sections of men of all regiments of the corps and with two strange officers and supported by the fire of a battery which had meantime, goodness knows how, reached the Galgenhübel they stormed the hillock and rushed into and beyond Elsasshausen just in time to take Bonnemain's famous cavalry attack in flank, delivered against the mass of skirmishers of the Vth and XIth Corps, which had here intermingled. Curiously enough only formed bodies got into squares which were never reached as the cavalry floundering along the front of the skirmishers were scattered before their murderous fire.

Wood Fighting.

Meantime the 12th Company commanded by von Boguslawski and forming the extreme *left* of the attack of the Vth Army Corps had been gaining considerable experience in wood fighting.

As soon as he had crossed the river at Spachbach with two of his sections, he noticed that men of the XIth Army Corps were constantly streaming back from the Niederwald to the Sauer, and knowing how difficult it would be to regain the *lisière* once in possession of the French, he dashed up to it.

His first section which was following in support lost him and soon was fighting on the extreme *right* of the attack, and he did not see it again that day.

At first he only came across dead and wounded Zouaves and Turcos but soon his left was attacked by Turcos. Wheeling to the left as well as he could be drove them over a large glade and was proceeding to follow when they suddenly made a counter attack and drove him back to the north edge of the glade. Here he managed to stop his men with a whistle to which he had trained them in peace time. The men of this company were fighting in caps, having left their helmets in a village when going on out-post duty, and being mistaken for Frenchmen were soon under fire from their friends who could only be persuaded to desist by much waving of handkerchiefs. I may remark that when the 12th Regiment were attacking the Rotherberg at the battle of Spicheren they were fired into on four separate occasions, by their friends, and one private who had told himself off for the dangerous duty of running up to stop them received the Iron Cross for his bravery.

Gradually the Turcos disappeared from the opposite *lisière* and after considerable difficulty the firing was stopped and the company withdrawn in a north-westerly direction to try and rejoin its battalion. On the way they suddenly came on a strong body of French skirmishers only 100 yards off. They managed to hold out in what von Boguslawski describes as a hell upon earth of bursting shells, torn branches and the rattle of small arm fire, till part of the company managed to enfilade the French, who retired.

When the remainder of the regiment, re-inforced by the 17th Brigade, made the general forward movement above recorded, von Boguslawski who by this time had only 40 men of his company with him, advanced also and after being twice driven back he got into the little copse near Elsasshausen by 2 P. M. and tried to collect his company. He could however only get one sergeant and 20 men and joined the general skirmishing line of the XIth Army Corps for a further advance. They were just leaving the wood when suddenly the firing was redoubled and a regiment of Turcos came bounding through the smoke firing and yelling. This was too much even for Prussian Grenadiers and away they all went followed hard by the Turcos towards a small hillock which stands a few hundred paces from the eastern edge of the wood. At each *lisière* the officers made every effort to stop the men but it was useless. Fortunately just at this moment a battery of artillery appeared on the hillock and a formed company was seen also. The men were stopped and a murderous fire turned on the pursuing Turcos who were only 50 yards off and a fresh advance on Elsasshausen was made. Here the inner flank of the XIth Army Corps attacking from the south and the Vth Army Corps from the east collided and a dense confused mass of men of all ranks and regiments was met with. Companies were improvised, some led by generals and, supported by a Wurtemberg Regiment, the mass rushed forward towards Froschweiller. The orchards outside were full of fruit and the men who had been fighting all day with nothing to eat and drink fell on the fruit and could only be led forward again with great difficulty.

Von Boguslawski had now two officers and 25 men of his own and two other companies with him and following a small foot-path, entered a narrow alley in Froschweiller. Arriving at the main street he suddenly came on a French company forming up to march off. He called on them to surrender but instead of replying they tried to get into a narrow street on the other side of the road. He opened fire, which they returned at 25 paces interval and for a few seconds this continued and then the French threw down their rifles and the officers stepped over and surrendered just as with deafening cheers Germans burst into the village from every direction.

And now what a sight. Out of the houses and in isolated groups fine old French soldiers carried on the hopeless game, but were soon overpowered and stood sulkily watching Germans from every Gau in Germany yelling themselves hoarse with delight at the first great blow struck for German unity.

And where is our regiment?

Thirty-two officers, 56 non-commissioned officers and 783 men are on the ground. Another third are scattered along a mile of fighting line. Another third even in this well disciplined regiment are waiting till their comrades have stormed the village, when they too will come yelling on. After all they have fought under their officers for 7 or 8 hours and when these latter were killed or ran again to the front, human nature asserted itself and they no longer followed.

One more Short Sketch.

These two stories are typical of a modern fight and probably if every officer at Worth could write his version of the story there would be a great resemblance to these, but I will just put down one more instance to show what we have to expect.

In 1870 every German knew that sooner or later war with France was inevitable, but in July no one suspected it. Officers were on leave and the declaration of war came as a wild surprise to every one. The excitement was past all description; I witnessed but could not describe it. Even officers of high rank assembled their subordinates and told them that perhaps to meet a sudden French advance, all troops would be sent at once to the frontier as they were and that all should prepare for such a measure.

Amidst all this came the short telegram "Mobilisation as per regulation, 16th first day of mobilisation." The effect of this was magical. All excitement ceased and soldiers and civilians set to work in the most business-like frame of mind to carry it out.

Well, mobilisation was completed and at 2 A. M. the regiment marched 15 miles to be entrained for the Rhine. It pelts with rain and the bran new boots and clothes get thoroughly soaked. There is a four hours delay in entraining and the men lie down in a quiet bye street to sleep. During the 40 hours journey to the Rhine the heat is intense and the wet clothes steam and the new boots draw. Arrived in the Rhine Phalz, the inhabitants produce wine and food in abundance. The former upsets the North German stomach and men are ill. The colonel assembles the regiment and explains that illness on service is a disgrace, especially if caused by eating or drinking unwholesome compounds; and that not only has every man to look after himself, but he must look after the younger soldiers as well.

After a course of wet bivouacs and 48 hours with no food except raw potatoes, the regiment nears the field of battle and hears the roar of guns.

A shell explodes near the colours and is found to be a German one. An aide-de-camp rides up and tells the colonel that the brigade commander wants him to re-inforce his extreme *left*. Column of attack is formed. The colonel and the major of the leading battalion ride on to find out from the brigade commander exactly what he wants. (This major never finds his battalion again and is shot charging with another regiment.) The divisional commander now meets the regiment and directs the leading battalion to re-inforce his extreme *right*. The senior captain takes command of the leading battalion and moves to the right when he is met by the brigade commander of another brigade who points to a steep hill saying, my first regiment has just stormed part of that, I want you to take the portion on the left. The men take off their packs and the general notices and praises some bandsmen who have picked up rifles and joined the ranks. The hill is climbed in great disorder. The captain of the leading company is shot and the subaltern orders section commanders to collect their commands. This is done with great loss and all three commanders are shot. The sections again shake out and are led by the bold spirits in each to the top.

Meantime the second battalion continues after the colonel. An hussar rides up and points out that a rifle regiment is being outflanked. The major on his own responsibility sends his leading company to prolong their line. But the captain of the next company is a man who can never be left behind and he leads his company through the first at the double, prolongs the line and storms a village followed by the rest of the battalion. It is found full of every kind of provisions and the half famished soldiers eat and drink their fill. But now the serious work begins. The battalion is ordered to storm another village on a hill. Line is formed to keep the men in hand and skirmishers are sent forward. The mounted officers are soon shot down but the advance continues in spite of ever increasing losses. No one thinks of cover or aiming. The one idea is that the village has to be stormed and that the honor of the regiment is at stake. Near the top a low wall is reached beyond which it is certain death to show oneself. Several try but fall at once pierced by half a dozen bullets. A young Saxon officer with his battalion colour in his hand jumps on the wall and gives a cheer for his Prussian comrades and falls at once. Two Prussian lance corporals recover the colour and hand it to their subaltern who carries it for an hour before he gets a chance of restoring it to its battalion.

The men pull the stones off the wall and throw them in the air to fall on the heads of the Frenchmen inside. Soon a friendly shell blows in a breach through which the men shoot till all the defenders are down.

The brigadier who was watching the loop holes through his glasses from another part of the firing line where he was lying down, notices that they are no longer defended, and is just about to give the order for a general advance when the men jump up of their own accord and rush in. Rough groups are formed to resist counter attack and the burning houses are cleared of dead and wounded. Next morning under the influence of the awful losses there is an absence of the usual chaff and merriment. The divisional commander notices this, assembles the officers and explains to them that it is their duty to set an example of cheerfulness to their men no matter what their feelings may be and soon songs are started and everything goes on as usual.

Lessons from the Modern Battle.

Now all this is very unorthodox. In fact when I read Section 5, Part V. (page 296) of our tactics as described in the Field Exercise I can readily imagine how shocked and angry clubdom would be at such goings on. But it is a faithful picture of a real battle. I have not been describing the actions of a raw militia but of the most highly trained infantry in Europe. Clubdom would say:—"If the positions had first been carefully reconnoitred, if the attacks had not been premature, if contradictory orders had not been issued, if the major of the leading battalion had not left his battalion, if the battalion had kept its touch and dressing by the centre while climbing an almost precipitous height &c., &c., all would have gone well." But these ifs don't come off in real war. In the instances under consideration very few ifs did come off and we are forced to ask what amidst all this wild confusion, a confusion which in peace time had been considered as a disgrace which must not occur again, which had not been regarded as a necessity to be provided and trained for and practised over and over again, what saved the Germans from disaster?

which they accomplish with ease. Their food is chopped straw (*kah*) and barley (*jao*). All that we passed looked in excellent condition; but. of course, a few sores are inevitable. They will travel on level ground about 3½ miles an hour.

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If only roads and carts were instituted, the amount of mule power that might be saved can easily be imagined. Even one good road, say from Shiraz to Bandar Abbas, would serve to tap the trade of the country far better than can be done over the rocky passes of the Bushire route. The Shah has been urged to this many times, and his consent has even been gained to road-making; but he is so much in the hands of the ministers, that the schemes have fallen through. Only around Tehran are there a few roads, leading to some of the Shah's palaces and gardens, and also from Tehran to Resht; but this we did not see; it is at any rate passable for carriages.

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Introduction.

Speaking at the Royal United Service Institution in 1884 Lord Wolseley said :—

"I cannot help thinking that all the armies of the world, certainly our own, have always reversed the order in which drill ought to be taught. Our notions as to what a battle ought to be seem to have come down to us from prehistoric times almost. We then apparently set to work to create a system of drill to meet the circumstances and exigencies of this imaginary battle. My view of drill would be exactly the reverse of that process. I would first of all read the books written by others who have great experience of what has taken place and what does take place in every action. I would first find out exactly what it is, what an action is, from the very first moment a shot is fired until the position on either side is stormed and taken. I would find that out, find out what the duties of a private soldier really are and having thoroughly arrived at that conclusion then work back from that to the goose step."

* * * * *

I was much struck on reading these very common-sense remarks and at once set to work to act on the advice given, but found it far easier said than done.

Map in hand I read the Prussian official account of some of the early battles in 1870 and I was left with a very clear notion of the course of events, but much as they taught me I could not sit down and draw a faithful picture of a modern battle. Human beings had been fighting and marching and getting killed, but one must look more behind the scenes to try and realize their feelings and individual actions. Day after day I sat down and tried to write a clear impression of what I had learnt and again and again I failed. Somehow the mainspring seemed to be wanting, the usual wheels of tactics went merrily round, but the motive power which forced those tactics was not apparent to me. Colonel Lonsdale Hale then lent me the Regimental Histories of the 4th Prussian Foot Guards and of their 8th and 50th Infantry Regiments, the latter written by the well known von Boguslawski. One must not depend too much on such narratives, but at any rate they draw a faithful picture of what perhaps they would gladly hide, namely, the results in a real battle of a peace training for an imaginary one. I still feel I have failed to draw the picture I would like of a real battle as left on my mind by these works. They are so brimful of incident, so bristling with proof of how unlike the real is to the ideal battle, that any attempt to shorten their story must be tame and incomplete compared with the original. But in every line they show not the advisability but the absolute necessity of following the principle contained in Lord Wolseley's remarks.

I choose the early battles of 1870 advisedly because we find the Germans stepping into action after having been carefully trained for an imaginary battle very unlike the real ones they were to take part in and the reception they met with is most instructive. But it will first be necessary just to glance at that peace training between 1866 and 1870 to trace the ideas with which they entered on the campaign.

Patient hard work, discipline, education, patriotism, and in a lesser degree a good weapon, had triumphed in 1866 over tradition, ignorance and a want of national feeling. But the thinkers in each arm saw many and serious faults in their tactics altho' they had been victorious.

Perhaps the most sweeping reforms of all came to the artillery. A rugged old soldier, foreseeing an early death from heart disease, longed first to see the fulfilment of an all absorbing idea. Von Hindersin foresaw the coming struggle for German unity and, as he told the Emperor, felt that in a decisive battle the result might hang on the efficiency of the arm for which he was responsible and that he could not sleep at nights till he saw his way more clearly. Rifled cannon were introduced, a school of gunnery was formed on the English model and he told his batteries that drill and polish were all very well but that they were useless till they had learnt to shoot.

There was further among the artillery a wide spread feeling that they had failed tactically in 1866 and that the place for the then called reserve artillery was not in rear of a column going into action.

In the infantry a bitter paper war had been waged. It was found that the three-rank battalion columns, which the old school considered the main stay of Prussian discipline in action, had naturally and of necessity dissolved themselves into a thinner formation. Floods of pamphlets appeared suggesting means for preventing this in future. Late in 1869 an anonymous one appeared, whose writer could exultingly exclaim "Now we are independent of theory, we have seen, seen with our own bodily eyes, the reality." It contained the startling theory that this very thinning out was not a thing to be discouraged, but that it was a necessity, and that the object now was to introduce as much order and method as possible into this apparent disorder.

Authority did not adopt this idea, on the contrary, contradicted it in a semi-official pamphlet, which must be looked on as a considerable historical curiosity by its author the present War Minister of the German Empire who has just issued the new German drill book which out-Herods Herod. The not altogether illogical conclusion that the authorities had come to as to the great value of the breech-loader was: that whereas with the old weapon it was necessary to extend a section in skirmishing order, now half a section could do as much execution; and this idea was emphasized at all inspections. "Gentlemen throw out very few skirmishers, only one half section, that is now as efficient as a whole section was formerly. Let all the rest be kept well in hand."

THE REAL *versus* THE IMAGINARY

BY

CAPTAIN NORMAN BRAY, 2nd *Battn. Royal* [illegible] *D.S.O.,* [illegible]

Introduction

Speaking at the Royal United Se[illegible] W[illegible]

"I cannot help thinking that all [illegible] our own, have always reversed the [illegible] taught. Our notions as to what a b[illegible] drawn from [illegible] work to create a system of [illegible] of the [illegible] battle. W[illegible] reverse of that process. I want [illegible] who have real exper[illegible] in every action, what an action is, from the [illegible] what the [illegible] arrived at th[illegible]

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I was much struck [illegible] set to work [illegible]

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[illegible] whose [illegible] Only one company [illegible] improvised foot [illegible] of the country, [illegible] off and were [illegible] batteries, which [illegible] and fired at the [illegible] The men [illegible] were [illegible] of the great [illegible] flashes of fire [illegible] water [illegible] lines [illegible] were [illegible] as it got over [illegible] threw themselves [illegible] foot of the [illegible] well posted [illegible]

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play a great game of containing the
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was also very slow and meantime it was noticed
was slackening. They had retired before the awful
e of guns. And as so often happened in this war, the
dashed forward and gained the crest without orders.
rs were down but an officer blew the "advance" to let the
de know what had happened.
n the French made a vigorous counter attack and this time
the 50th over the high road down to the river. But here and
e groups stood fast and, together with such of the re-inforcements
ho had got across the Sauer, stopped the pursuing French and over-
whelmed them with fire as they retired. The crest was gained again
and twice the French made counter attacks but now the Prussians were
too strong for them and advancing by the "leap and hold" method,
they seized fold after fold, beat off counter attacks, and were not check-
ed till they reached the hillock in front of Elsasshausen. During the
advance the divisional commander was fighting in the front rank like a
grenadier. It was all he could do, all his command was scattered over
a mile of country, his last reserve was in first line and all he could do
was to set an example of pluck and dash. Thus as May pointed out
after 1866, some companies had no officers, other groups were led by
half a dozen field and general officers.

The men were hopelessly mixed up and no well organized attack could be made till an adjutant ran to the front and called out, "All men with yellow shoulder straps (the distinguishing badge of the Vth Army Corps) form round me."

All three arms had written themselves into a state of mutual jealousy which was to bring about both very good and very bad results in 1870.

In England where such jealousies are merely social their importance is under-estimated.

The Real Battle. An Infantry Combat.

Now let us follow von Boguslawski's description of the doings of his regiment at Worth.

On the eve of Worth the 50th Regiment were on out-post duty from the Füchshübel to Gunstett. All the officers and non-commissioned officers had been told that no fighting was to take place on the 6th and were therefore surprised to see the fight commence.

About 10 A. M. the 1st and Fusilier Battalions were ordered to cross the Sauer, an insignificant obstacle when not in flood; but when flooded, as it was on the 6th August 1870, it was 6 or 8 feet deep and 20 to 30 yards broad.

The 2nd Battalion who since dawn, had been fighting round Gunstett were ordered to guard the river passages at that point. The 1st Battalion advanced in company columns towards the Galgenhübel. The Fusilier Battalion just touched Spachbach with their left flank, two companies in first line, two in second.

They were soon stopped by the Sauer, whose swollen condition made it quite unfordable in most places. Only one company could ford it up to their necks in water, the others improvised foot bridges with the long stout hop poles used in that part of the country, which could only be crossed very slowly and several men fell off and were drowned.

During the crossing the French batteries, which had at first withdrawn from the Prussian guns, reappeared and fired at the companies standing uncovered waiting to cross. The men however soon gained confidence when they found that in spite of the great noise few shells hit their mark. More serious was the Chassepot fire which could not be returned, especially when crossing the water and meadows beyond. The men saw this and did not fire, but each company as it got over ran across the thousand paces of open meadow and threw themselves into a ditch on the high road which winds round the foot of the Galgenhübel. Already the situation began to be unpleasant, a well posted army in front, a swollen river behind.

The first company reached the ditch long before the others had crossed and, doubtless thinking that the Galgenhübel was unoccupied and that he would make the operation of crossing safer, the captain led an isolated charge against it and reached the crest line, but a counter attack drove it back with terrible loss and the captain fell pierced by seven bullets. As von Boguslawski says:—"The brave von Burgsdorf carried with him to the grave his reasons for this bold attack." It was more than an hour before the crossing was completed, and when all had gained the high road the field officers wished it to be held till reinforcements came, but all command was impossible and isolated groups advanced to attack the Galgenhübel without orders. No one could hear a word of command but several officers ran forward and the men followed. With great loss the crest was gained and the French retired, but soon made a counter attack supported by artillery, which latter hit four officers, and the men again bolted back to the high road where the officers stopped them and the pursuing French were also stopped. For two hours some officers try to form closed bodies from the long mixed up line which were at once scattered again. Others, followed by 40 or 50 men each, dash up to the crest and take it for a minute till a counter attack again drives them back to the high road, not straight back but wedged outwards, and so mixes them up more and more. The ammunition begins to fail and the dead and wounded are ransacked for more. No re-inforcements come. Only the long line of guns send shell after shell over their heads whose effect they cannot see. The major walking coolly along the line begs the men to hold out, a bullet goes through his helmet as he is talking to a sergeant; he takes it off to feel for the wound and a bunch of hair falls out, he laughingly replaces it and continues his conversation. This little incident calms the men wonderfully but as von Boguslawski says, it is a hellish situation. Half the men and more than half the officers are down, no command is possible, ammunition short and a vigorous counter attack momentarily expected. But every one felt he was helping to play a great game of containing the French centre whilst the turning movement developed itself.

At one o'clock help arrived and the 17th Brigade was seen marching down to the Sauer.

But their crossing was also very slow and meantime it was noticed that the French fire was slackening. They had retired before the awful fire of the long line of guns. And as so often happened in this war, the men *instinctively* dashed forward and gained the crest without orders. All the buglers were down but an officer blew the "advance" to let the 17th Brigade know what had happened.

Again the French made a vigorous counter attack and this time drove the 50th over the high road down to the river. But here and there groups stood fast and, together with such of the re-inforcements who had got across the Sauer, stopped the pursuing French and overwhelmed them with fire as they retired. The crest was gained again and twice the French made counter attacks but now the Prussians were too strong for them and advancing by the "leap and hold" method, they seized fold after fold, beat off counter attacks, and were not checked till they reached the hillock in front of Elsasshausen. During the advance the divisional commander was fighting in the front rank like a grenadier. It was all he could do, all his command was scattered over a mile of country, his last reserve was in first line and all he could do was to set an example of pluck and dash. Thus as May pointed out after 1866, some companies had no officers, other groups were led by half a dozen field and general officers.

The men were hopelessly mixed up and no well organized attack could be made till an adjutant ran to the front and called out, "All men with yellow shoulder straps (the distinguishing badge of the Vth Army Corps) form round me."

He collected three good sized sections of men of all regiments of the corps and with two strange officers and supported by the fire of a battery which had meantime, goodness knows how, reached the Galgenhübel they stormed the hillock and rushed into and beyond Elsasshausen just in time to take Bonnemain's famous cavalry attack in flank, delivered against the mass of skirmishers of the Vth and XIth Corps, which had here intermingled. Curiously enough only formed bodies got into squares which were never reached as the cavalry floundering along the front of the skirmishers were scattered before their murderous fire.

Wood Fighting.

Meantime the 12th Company commanded by von Boguslawski and forming the extreme *left* of the attack of the Vth Army Corps had been gaining considerable experience in wood fighting.

As soon as he had crossed the river at Spachbach with two of his sections, he noticed that men of the XIth Army Corps were constantly streaming back from the Niederwald to the Sauer, and knowing how difficult it would be to regain the *lisière* once in possession of the French, he dashed up to it.

His first section which was following in support lost him and soon was fighting on the extreme *right* of the attack, and he did not see it again that day.

At first he only came across dead and wounded Zouaves and Turcos but soon his left was attacked by Turcos. Wheeling to the left as well as he could be drove them over a large glade and was proceeding to follow when they suddenly made a counter attack and drove him back to the north edge of the glade. Here he managed to stop his men with a whistle to which he had trained them in peace time. The men of this company were fighting in caps, having left their helmets in a village when going on out-post duty, and being mistaken for Frenchmen were soon under fire from their friends who could only be persuaded to desist by much waving of handkerchiefs. I may remark that when the 12th Regiment were attacking the Rotherberg at the battle of Spicheren they were fired into on four separate occasions, by their friends, and one private who had told himself off for the dangerous duty of running up to stop them received the Iron Cross for his bravery.

Gradually the Turcos disappeared from the opposite *lisière* and after considerable difficulty the firing was stopped and the company withdrawn in a north-westerly direction to try and rejoin its battalion. On the way they suddenly came on a strong body of French skirmishers only 100 yards off. They managed to hold out in what von Boguslawski describes as a hell upon earth of bursting shells, torn branches and the rattle of small arm fire, till part of the company managed to enfilade the French, who retired.

When the remainder of the regiment, re-inforced by the 17th Brigade, made the general forward movement above recorded, von Boguslawski who by this time had only 40 men of his company with him, advanced also and after being twice driven back he got into the little copse near Elsasshausen by 2 P. M. and tried to collect his company. He could however only get one sergeant and 20 men and joined the general skirmishing line of the XIth Army Corps for a further advance. They were just leaving the wood when suddenly the firing was redoubled and a regiment of Turcos came bounding through the smoke firing and yelling. This was too much even for Prussian Grenadiers and away they all went followed hard by the Turcos towards a small hillock which stands a few hundred paces from the eastern edge of the wood. At each *lisière* the officers made every effort to stop the men but it was useless. Fortunately just at this moment a battery of artillery appeared on the hillock and a formed company was seen also. The men were stopped and a murderous fire turned on the pursuing Turcos who were only 50 yards off and a fresh advance on Elsasshausen was made. Here the inner flank of the XIth Army Corps attacking from the south and the Vth Army Corps from the east collided and a dense confused mass of men of all ranks and regiments was met with. Companies were improvised, some led by generals and, supported by a Wurtemberg Regiment, the mass rushed forward towards Froschweiller. The orchards outside were full of fruit and the men who had been fighting all day with nothing to eat and drink fell on the fruit and could only be led forward again with great difficulty.

Von Boguslawski had now two officers and 25 men of his own and two other companies with him and following a small foot-path, entered a narrow alley in Froschweiller. Arriving at the main street he suddenly came on a French company forming up to march off. He called on them to surrender but instead of replying they tried to get into a narrow street on the other side of the road. He opened fire, which they returned at 25 paces interval and for a few seconds this continued and then the French threw down their rifles and the officers stepped over and surrendered just as with deafening cheers Germans burst into the village from every direction.

And now what a sight. Out of the houses and in isolated groups fine old French soldiers carried on the hopeless game, but were soon overpowered and stood sulkily watching Germans from every Gau in Germany yelling themselves hoarse with delight at the first great blow struck for German unity.

And where is our regiment?

Thirty-two officers, 56 non-commissioned officers and 783 men are on the ground. Another third are scattered along a mile of fighting line. Another third even in this well disciplined regiment are waiting till their comrades have stormed the village, when they too will come yelling on. After all they have fought under their officers for 7 or 8 hours and when these latter were killed or ran again to the front, human nature asserted itself and they no longer followed.

One more Short Sketch.

These two stories are typical of a modern fight and probably if every officer at Worth could write his version of the story there would be a great resemblance to these, but I will just put down one more instance to show what we have to expect.

In 1870 every German knew that sooner or later war with France was inevitable, but in July no one suspected it. Officers were on leave and the declaration of war came as a wild surprise to every one. The excitement was past all description ; I witnessed but could not describe it. Even officers of high rank assembled their subordinates and told them that perhaps to meet a sudden French advance, all troops would be sent at once to the frontier as they were and that all should prepare for such a measure.

Amidst all this came the short telegram " Mobilisation as per regulation, 16th first day of mobilisation." The effect of this was magical. All excitement ceased and soldiers and civilians set to work in the most business-like frame of mind to carry it out.

Well, mobilisation was completed and at 2 A. M. the regiment marched 15 miles to be entrained for the Rhine. It pelts with rain and the bran new boots and clothes get thoroughly soaked. There is a four hours delay in entraining and the men lie down in a quiet bye street to sleep. During the 40 hours journey to the Rhine the heat is intense and the wet clothes steam and the new boots draw. Arrived in the Rhine Phalz, the inhabitants produce wine and food in abundance. The former upsets the North German stomach and men are ill. The colonel assembles the regiment and explains that illness on service is a disgrace, especially if caused by eating or drinking unwholesome compounds; and that not only has every man to look after himself, but he must look after the younger soldiers as well.

After a course of wet bivouacs and 48 hours with no food except raw potatoes, the regiment nears the field of battle and hears the roar of guns.

A shell explodes near the colours and is found to be a German one. An aide-de-camp rides up and tells the colonel that the brigade commander wants him to re-inforce his extreme *left*. Column of attack is formed. The colonel and the major of the leading battalion ride on to find out from the brigade commander exactly what he wants. (This major never finds his battalion again and is shot charging with another regiment.) The divisional commander now meets the regiment and directs the leading battalion to re-inforce his extreme *right*. The senior captain takes command of the leading battalion and moves to the right when he is met by the brigade commander of another brigade who points to a steep hill saying, my first regiment has just stormed part of that, I want you to take the portion on the left. The men take off their packs and the general notices and praises some bandsmen who have picked up rifles and joined the ranks. The hill is climbed in great disorder. The captain of the leading company is shot and the subaltern orders section commanders to collect their commands. This is done with great loss and all three commanders are shot. The sections again shake out and are led by the bold spirits in each to the top.

Meantime the second battalion continues after the colonel. An hussar rides up and points out that a rifle regiment is being outflanked. The major on his own responsibility sends his leading company to prolong their line. But the captain of the next company is a man who can never be left behind and he leads his company through the first at the double, prolongs the line and storms a village followed by the rest of the battalion. It is found full of every kind of provisions and the half famished soldiers eat and drink their fill. But now the serious work begins. The battalion is ordered to storm another village on a hill. Line is formed to keep the men in hand and skirmishers are sent forward. The mounted officers are soon shot down but the advance continues in spite of ever increasing losses. No one thinks of cover or aiming. The one idea is that the village has to be stormed and that the honor of the regiment is at stake. Near the top a low wall is reached beyond which it is certain death to show oneself. Several try but fall at once pierced by half a dozen bullets. A young Saxon officer with his battalion colour in his hand jumps on the wall and gives a cheer for his Prussian comrades and falls at once. Two Prussian lance corporals recover the colour and hand it to their subaltern who carries it for an hour before he gets a chance of restoring it to its battalion.

The men pull the stones off the wall and throw them in the air to fall on the heads of the Frenchmen inside. Soon a friendly shell blows in a breach through which the men shoot till all the defenders are down.

The brigadier who was watching the loop holes through his glasses from another part of the firing line where he was lying down, notices that they are no longer defended, and is just about to give the order for a general advance when the men jump up of their own accord and rush in. Rough groups are formed to resist counter attack and the burning houses are cleared of dead and wounded. Next morning under the influence of the awful losses there is an absence of the usual chaff and merriment. The divisional commander notices this, assembles the officers and explains to them that it is their duty to set an example of cheerfulness to their men no matter what their feelings may be and soon songs are started and everything goes on as usual.

Lessons from the Modern Battle.

Now all this is very unorthodox. In fact when I read Section 5, Part V. (page 296) of our tactics as described in the Field Exercise I can readily imagine how shocked and angry clubdom would be at such goings on. But it is a faithful picture of a real battle. I have not been describing the actions of a raw militia but of the most highly trained infantry in Europe. Clubdom would say:—"If the positions had first been carefully reconnoitred, if the attacks had not been premature, if contradictory orders had not been issued, if the major of the leading battalion had not left his battalion, if the battalion had kept its touch and dressing by the centre while climbing an almost precipitous height &c., &c., all would have gone well." But these ifs don't come off in real war. In the instances under consideration very few ifs did come off and we are forced to ask what amidst all this wild confusion, a confusion which in peace time had been considered as a disgrace which must not occur again, which had not been regarded as a necessity to be provided and trained for and practised over and over again, what saved the Germans from disaster?

In a great measure no doubt numbers allowed of the appearance of those formed bodies, which worked such wonders. Also, as I hope to show, their artillery had been trained for the real battle and also worked wonders. But what for instance enabled the 50th for three hours to hold out in that hellish situation along the high road!

One all important part of a training for the real battle had not been neglected. The German word "mannszucht" admirably explains their conception of the word discipline. The careful individual training of each man to feelings of honor and iron military spirit by a corps of officers who possessed these qualities in the highest degree. He must take such care of himself that come what may he must be present with his company in action; absence is then a disgrace, he must die enthusiastically and be cheerful under the greatest pressure of privation and loss. Furthermore his frame had been hardened to stand the strain of the awful work described. All this is training for the real battle but in his tactics what becomes of his careful peace training for the prehistoric battle? Tactics the reverse of what he has been taught have now to be improvised. Attempts are made even in action to cling to the old customs but the breechloader makes it impossible to do so. Every effort to get the men in hand fails, instinctively the daring spirits in each group lead it again and again to the front and soon all tactical formations are lost. Now comes the absolute necessity of working back from this state of things to the goose step.

Marching past, faultless wheeling, precise bayonet exercise, do not help here. As Lord Wolseley says "as well teach us the hornpipe." If we had had space to glance at some of the later actions in this war we should have seen how the hard and bitter lesson was gradually learnt and how skilful the minor leaders became. And as soon as peace was proclaimed we might naturally have expected that these hardly earned ideas would be perfected and arranged. But no, the powerful magnet of the prehistoric battle resumes it attraction and we find the Emperor thanking his God that "all that loose stuff we had in France" is at an end, and once more revelling in a Tempelhof review.

As after 1866 so after 1870 we find the main question begged. The great cry was that owing to the great losses looser formations were necessary. The prehistoric drill was kept up "to maintain discipline" and an attack formation was invented by which it was hoped a position could be won without such heavy loss. It was soon found that a good deal of disorder ensued which did not look military and every effort has since been made to remedy this. Those commanding officers who had the pluck to risk the success of the steady drill by practising the attack at all devoted all their ingenuity to make it as steady as the advance in review order. Then behind this bugbear loomed the horrid word "tactics." The commanding officer found his subalterns taken away and taught a mysterious science called "tactics" Learning that it was all contained in five chapters of Clery the book was purchased and read, and now much against his will, our colonel has become a veritable radical and can snap his fingers at any general and if some day he is fortunate enough to lead his battalion into action his mind would be busy how to apply Para. 11 Chapter 4 of Clery.

Fortunately he is the very best raw material to work on, he has the first necessary quality of an iron military spirit. If he has not yet acquired "the pith of sense" he has "the pride of worth" which will take him triumphantly through the horrors of a modern battle. But more is required. He must harden his frame to stand the work, learn by practice in the open the tricks (I will not call them tactics lest they should frighten him) to employ, and embue his men with his own spirit. And it must be a real and not a sham spirit. It is said that whether officers believe it or not they should impress on their men how invincible they are. By all means having taught them all the cunning tricks by which they can circumvent their own and other arms impress on them their invincibility if they employ those tricks. But if you tell them the old story, British pluck and physique will take them through everything and if some day British pluck is blown to atoms 1000 yards from a battery a feeling will come over the men that they have been deceived and are being led by officers who do not know war. No, be honest and straightforward with them, tell them exactly what the modern battle is like and even teach them that circumstances may arise when their carefully trained tactics cannot be employed and that they may some day have to sacrifice themselves as von Bredow's cavalry did at Vionville. Remind them of Balaklava and miss no opportunity of telling them that such a moment should be the height of their ambition and that the great distinction between a soldier and a mere civilian is that whereas the latter wishes to end his miserably insignificant career in his bed the former has the proud privilege of being able to die on a glorious field of battle after having helped to bring imperishable renown on his name, on his regiment, and on his country. As von der Goltz says:—"if the humblest of Alexander the Great's soldiers could rise from the dead and come among us he would be courted and fêted just as much as the great leader himself would be." This is a real and not an artificial spirit and it will carry him through a modern fight. Those who imagine, that the British private soldier is incapable of such feelings of military spirit know very little about him.

Then let our colonel practise his men over and over again in the open in the various phases of a real battle, teach them to think and act for themselves like a well trained football or polo team and when the day of trial comes neither himself nor his battalion will be found wanting.

Peace Training for a Real Battle.

I have endeavoured to show the effects on the infantry of their prehistoric training, let us now turn to a more refreshing picture of a successful peace training for a real battle.

In 1870 we find the German artillery always well to the front commencing the action, preparing the way for the infantry, advancing wherever necessaryto get a shorter range, supporting one another, following up their infantry and maintaining their forward positions in spite of loss, and acting in large masses. Their fire was searching and accurate altho' their rather primitive fuzes did not always ignite on impact with soft ground.

Compare this with their tactics in the 1866 campaign only four years before and let us trace the improvement.

In 1866 their artillery was conspicuous for its want of daring energy and tactical knowledge, it was seldom to be found where it was most wanted and if there could not hit. The same Vth Army Corps, who at Worth had 108 guns in action before its infantry attacked, was the same corps, who at Nachod sent its batteries dribling and late into action. Its peace training had then been based on the "battle of prehistoric times."

It must be remembered that the fact of the Vth Army Corps having a different commander does not affect the question. The various artillery commanders and subordinates in the Prussian army are taught from the earliest part of their military careers to play the game on their own responsibility and according to their own lights. Veiled in mystery as a scientific arm whose greatest secret was that there was no secret at all, it had formerly not been accustomed to work in harmony with the other arms, and sacrificed all its time to drill as a preparation for the review. At manœuvres it worked by itself and for itself. Its own technical requirements governed all its movements and perhaps the one great idea was the safety of the guns. Dash was everything, guns were even moved loaded and banged off before the trail touched the ground, whilst the staff sat stop watches in hand to time the movement. Then the captain got credit from the inspecting officer. Fault was never found for bad shooting, but if the wheeling was bad promotion was stopped.

Then came von Hindersin, whose career shows what can be effected by the character of one man. At his first inspection as Inspector General of Artillery after making a few remarks about the drill and turn out he asked for the result of the target practice. "And now gentlemen we come to the main point. These figures speak loud enough, this must be altered."

A school of gunnery was formed on the English model and the batteries were taught to shoot. At manœuvres guns were never allowed to be fired off till distances had been judged, fuzes fixed, and the guns properly laid. The batteries were practised in trotting long distances and above all tactics were thought out, and we see the artillery arriving on the field at Worth prepared for a real battle. In many cases far in rear they cram to the front, having learnt how to do so, get into position, shoot straight, follow their infantry and enable them to hold what they have helped them to win. Ammunition does not fail and if I had space I should much like to show how this was due to the decentralised individual training of every officer in peace time. Prince Kraft of Hohenlohe shows it admirably in his 9th letter on Artillery. Where should we have been? Waiting for orders and Army Form B 604 in triplicate.

Thus at the outset of the campaign this arm is enabled to show the results of their peace training in a far more remarkable way than either the infantry or cavalry, and establish a new era in the employment of their arm, which recent improvements in material only emphasize. I have perhaps dwelt somewhat long on the peace training of this arm but it is after all of the very first importance. The greater the tactical success achieved the more diligently should the causes be sought after. Their success bears out the justice of the remarks of Lord Wolseley at the head of this paper just as well as the failure of the infantry does.

And now having followed the advice contained in those remarks and tried to realise what a real battle is like what conclusions do we come to?

First that we are undoubtedly still hard at work training for the prehistoric battle.

Let us think again and again over these battle pictures. A great game has to be played, it is no mathematical problem to be worked out. Every combatant must understand the part or rather the hundred possible parts he may have to play. General principles may be learnt from books but it is only by endless practice in the open that the three arms can learn to play the game together. It is difficult to make a peace manœuvre anything like a battle but the more the men are trained to work coolly for the common end amidst the crash and confusion, even of a sham battle, the better. And we must face the difficult question of this confusion. It is inevitable and can only be remedied by the highest training of the men themselves and the minor leaders. If one wishes to learn to ride one does not devote the whole of one's life to taking care that one never mounts a real horse.

Let us burn the hobby of the prehistoric battle and mount the real one and learn to ride it while there is yet time.

Since the above paper was written the new German drill book has been published adopting the principles recommended above. Principles which have been the life and soul of the younger generation of German officers for many years and which they have at length seen published as an official drill book. It is a living principle which will never again have its life crushed out of it by pedantry and red tape. Let us hope the English officer will soon have a similar work as his guide. The new infantry drill is a short step in the right direction.

PROFESSIONAL NOTES ON A VISIT TO AUSTRALIA.

BY

VETERINARY SURGEON (1ST CLASS) W. S. ADAMS.

Having been for many years associated with freshly imported Australian horses, during my recent visit to the colony, I devoted myself, as far as possible, to seeing and learning as much of the Australian horse in his own country as I could. Through the kindness of friends I was enabled to see and learn much, and I made the following notes:—

BREEDING.—In order to facilitate the description of horse-breeding in Australia, I will divide it into four classes:

(1) Horses bred in a state of nature, in the "runs;"
(2) Horses bred and reared on farms;
(3) Horses bred and reared at breeding stations;
(4) Thorough-bred stock.

1. Unfortunately my limited stay in Australia prevented me from visiting any of the "runs" and seeing any of what are termed the "mob" horses. I learn, however, that the breeding is very promiscuous, for there can be no selection of either sire or dam. Entire horses are turned out with mares, and soon form their own parties, each stallion taking to himself a number of mares and sticking to them. In the "bush" the foaling season extends over a long period, from the commencement of spring to well past midsummer, or say from August to February. As yearlings, they are brought up into stock-yards and branded, with the brand of the station, and the colts are at the same time castrated. At this time some of the more promising are selected and kept in the paddocks. Horses in the bush depend entirely on grazing, which is sometimes very scanty, and horses have to travel long distances before they get their feed or water. In times of protracted drought, which are frequent in Australia, there is absolutely no grazing, and the horses in the runs have to subsist on a species of vegetation, known as salt-bush, till they have tided over the drought.

2. BREEDING AT THE FARMS.—This is, I think, an extension of the system which prevails in England or in certain parts, where every farmer keeps a few mares from which he expects a foal every year, and at the same time the mare would be earning her living on the farm. Care and attention is paid by the farmers to the breeding, and if suitable stallions are not kept, the services of a horse, adapted to the mares, is obtained. The produce is, generally speaking, a useful class of draught horse, and one which obtains a ready sale; as, having been reared on the farms, they are accustomed to civilization, and are easily broken in.

3. BREEDING AT STATIONS.—Much capital is devoted to horse-breeding at stations, and it is a matter very thoroughly carried out. Great care is taken in the selection of stud horses and of the brood

mares. The stud horses are stabled and the mares and foals are kept in paddocks. Horses are bred to suit the requirements of the market, whether it be for exportation to India for army purposes, or the private market ; or to meet the demands of the local market. The general use of the light American buggy, has created a demand for light active harness horses, it is said, to the detriment of the larger class of horses of the type of the English carriage horse, and I found that it was difficult to obtain a good pair of carriage horses, which always command high prices. In the town there is a constant demand for the heavy draught horse. At one station which I visited I saw a magnificent Clydesdale stallion, by which some valuable heavy draught horses had been produced. The Norfolk Trotter is very popular, and by these horses some very useful stock is produced, and some of the best horses used in the light American buggies are from his stock. The high class Horse Artillery and British Cavalry horse which are exported to India are mostly by T. B. stallions, bred in Australia from English mares. Some of the wheelers are by the Norfolk Trotter, but the best wheeler is a horse from an active, clean-legged, cart mare by a T. B. sire.

4. The breeding of thorough-bred stock is largely carried out in the colony. Through the kindness of friends I was able to see some of the best establishments. The best blood is imported and the pedigrees are kept very clear. This T. B. stock is chiefly for racing, which is a very popular amusement in the colony, and there is a constant demand for horses with racing qualities. The young stock which I saw were remarkably well grown ; this must be attributed not only to the climate, which seems to be most favorable to the development of young stock, but also to the excellent grazing in the paddocks and to the care of the dams, whilst in foal, and with the foals at foot. In the paddocks where the mares and foals are kept, there are shelter sheds in which oat-hay is placed at night ; this is full of nutrition and excellent feeding.

PONY-BREEDING.—I could learn but little with regard to pony-breeding. I am, however, informed that it is being taken up as a paying investment. Some Shetland and Exmoor ponies have been imported ; these are put to well-bred small galloways, and the result is a very good class of pony. Ponies are always on demand and fetch good prices, especially matched pairs and ponies likely to race.

GRAZING FARMS.—After the above brief notice of breeding, I will mention a class of dealers who may be termed "middle men." These men are excellent judges of young stock ; they purchase young horses and keep them on grazing farms, till they are fit for sale either to the Indian shippers or for the local market. There are several of these farms at Gippsland, Victoria. Purchases made from the grazing farms have an advantage of the purchases from "mob" horses or from the periodical sales of young stock. They have been primarily selected, and subsequently weeded, and the purchaser has a further selection, and these horses, from having been in paddocks, are more handled and break in more readily.

AGEING.—With regard to the variations which we find in the ageing of Australian horses, it is to be explained by the length of time over which the foaling season extends, and this would be further influenced by the differences in climate in the vast continent of Australia. The system of ageing horses for the service in India, of calling a horse 4 till he is 5, 5 till he is 6, and so on, is very simple; nevertheless, we cannot avoid some horses getting an advantage over others. The 1st of August is the date from which thorough-breds are aged in Australia, and this is the date we adhere to in ageing our Australian remounts. After the horse has a full mouth, the wear of the teeth is greatly influenced by the nature of the grazing. During the hot season it is very dry, short, and scanty, and horses have to feed very close. We frequently see horses with palpably young mouths, but the "marks" in the teeth are already completely obliterated.

Food.—As shewn above the horses in the runs depend entirely on the grazing or whatever they can pick up. Horses at the breeding stations graze in the paddocks, and when required, both dams and foals are given oat-hay at night. Some of the paddocks are planted with the most nutritious grasses. I had no opportunity of enquiring into the nature of these grasses, but I was shewn a paddock in which there was abundance of what was termed "prarie" grass, which is said to be nearly as nutritious as oats, which it somewhat resembles when in flower. No meadow hay is cultivated, but oat-hay is used entirely; this is almost in seed, and is nearly corn and hay in one feed, and is wonderful feeding. Many horses even in constant work get no grain feed, but depend solely on the oat-hay, which proves sufficient to keep them in condition and to maintain their strength. The grain used for horse feed is oats and maize; the latter is sometimes given in lieu of oats or in addition to it. Bran is of two kinds,—wheat bran and bran from maize; the former is much used, and is of superior quality. I could gain no information with regard to any artificial food.

Brands.—Every breeder has the brand of his station on his horses; this is usually on the near shoulder, but is sometimes on the off shoulder, on the off or near side of the neck, on the quarter, or on the ribs. The brands are very various, perhaps an initial letter simply, or with a —, or a ⌒, above or below, or a circle, square, or triangle, or a letter with figures. Cyphers are sometimes used, and we find various devices as a cross, a key, an anchor or a thistle. The station brands are usually neat, but the brands of horses in the runs are often hideous disfigurements. The brand of the station, when once it is registered, is usually kept up after the originator has left, and the station has perhaps changed hands more than once. The owners of the grazing farms usually brand their horses on the near quarter, and the Indian shipper under the saddle, so that a horse exported to India will often have three brands on him:

1st.—The breeder's brand, on the near shoulder;
2nd.—The brand of the middleman, on the near quarter;
3rd.—The shipper's brand, under the saddle.

Indian Market.—The shipment of horses for the requirements of the Indian Government, and for the Indian private market is a very large trade in Australia, and there are many engaged in it. In order to be properly done, that is, to procure good horses at remunerative prices, it is necessary for the purchaser to travel far and to visit many farms, stations, and runs, and also the grazing farms. There are large periodical sales of young stock, where many of the horses for the Indian market are purchased, but they have to be taken with but little opportunity of previous examination, and must be purchased at a price to cover the cost of some which may afterwards turn out to be unsound or otherwise unserviceable. The same objection holds against the purchasing of "mob" horses, for in order to get a dozen suitable horses, a a lot of about thirty, may have to be purchased. A few horses may be bought in Melbourne, from amongst horses brought in for the local market. But the majority of horses will be obtained by travelling and visiting many farms and stations and picking up horses, according to requirements. Although many horses are purchased in New South Wales or even in Queensland, and in South Australia, nearly the whole of the horses for the Indian market are now shipped from Melbourne. Occasional shipments have been made from Perth, Western Australia, and from Sydney, New South Wales, but there has been no regular trade between these ports and India for some years. There are amongst the horses shipped for the Indian market many well-bred, valuable horses which would command high prices in Australia, and one is led to wonder how the shippers are able to get them at remunerative prices. It is only to be explained that they are able to buy them young and unbroken, which is a great advantage to the breeder, and doubtless they take others of less quality at the same time. The Indian market is a trade of itself, not only for the shippers, but also for the breeders, and as demand always creates supply, this trade would seem to be capable of any extension, provided the demand is steady. Horses having been purchased have to be collected at the port of embarkation, and are brought by rail or road as may be most convenient, and many have to be driven long distances. A large proportion are quite unhandled and in the rough at the time of shipment.

SEASON FOR SHIPPING.—With regard to the best season for shipping horses from Australia to India. The purchasing season of army remounts in India commences on September 15th and closes in March. The first shipments will leave Australia about the end of July, so as to arrive in India early in the season. This is a most unfavorable time for the horses to leave, as it is winter in Australia, and the horses have their long coats, which, from their being in the rough, are very heavy. On the voyage north, the change from great cold to extreme heat is very rapid, and is trying to the horses with their long coats on, and this is doubtless the cause of much sickness, loss of condition, and even mortality on the voyage. This season is also unfavorable for the shorter and cooler voyage across the Indian Ocean *viâ* Cape Lewin, which is now almost impracticable for horse-ships on account of the bad weather experienced. For this reason the horse-ships take the longer and hotter passage by the Torres Straits and Singapore, on which route, at this season, smooth water is expected. My experience tells me that horses landed in India in November or December appear to stand the voyage the best. They land in better condition, having commenced to shed their coats before leaving Australia they get rid of them before any extreme heat is experienced, and at this season horse-ships are able to take the shorter passage across the Indian Ocean *viâ* Cape Lewin. Horses landed in India at this time become acclimatized more quickly than those that are landed earlier, or those received in March, for the latter are putting on their coats on arrival, and do not shed them till July or August, which is much against the horses; the anomaly of having the long coats in the hot season, only occurs during the first year in India, subsequently nature seems to adapt itself to the altered conditions, and the Australian horses then commence to shed their coats in March and April, and put them on in September and October.

The Australian horse-shippers, have much to consider in bringing their horses for the Indian market.

1st.—It is necessary for them to hit off the market at the most favorable time, both as regards the Government demands, and the private market.

2nd.—*The freight.*—The freight varies. In the month of November and December—the most favorable time for shipping horses from Melbourne—the freight is high on account of the exportation of wool from Australia.

3rd —The most favorable season of the year for the voyage.

4th.—The best time of year for shipping horses with regard to their condition. &c.

All these considerations have their weight in a business point of view; but I think it would be to the interests of both the purchaser and shipper, if it could be arranged for the horses to leave Australia after they have shed their coats.

VETERINARY NOTES.—Horses certainly thrive most wonderfully in Australia, and whilst there seems to be absolute immunity from the most fatal diseases, as anthrax, glanders and farcy, the ordinary ills to which horses are liable affect them less in Australia than in England or India. In the winter I am told that cases of chest affections occur and in the hot season cases of disordered liver and fever. Abdominal diseases are rare; this fact is doubtless due to the simple, clean, and good feeding the horses get. Roaring is said to be rare amongst Australian horses; as the intending purchaser has but little opportunity of testing the horse for defective wind, this is perhaps fortunate. Diseases of the skin are exceptional. As far as I could learn, the eczematous disease so common and troublesome in India, is practically unknown. This fact, I think, favors my previously expressed opinion as to the effect of the continued use of green grass in the production of skin disease.

ENTAZOA.—Are very common, particularly in certain districts. The species generally met with are the Lumbricoid, Oxyuris, and the S. Tetracanthi. There does not appear to be any special liability to disease of the eye and worm in the eye is unknown.

LAMENESS.—Foot lameness appears to be very common, and a Veterinary Surgeon told me that he fully believed that in nine cases out of ten, of the cases of lameness which came under his notice, the seat of lameness was in the foot, or at any rate below the fetlock. This has been quite my experience with fresh Walers. I saw with him a two year old colt, quite fresh, which had suddenly gone lame, there was nothing to show for it, but heat in the foot and pastern directed to the seat of lameness; doubtless this was a case of incipient "ringbone." Here is a case of a perfectly fresh horse which had never been worked and never shod. The lameness cannot be attributed to any definite cause; there certainly may have been a blow or sprain caused in the paddock, but there is no history. I am inclined therefore more than ever, to believe in the influence of hereditary predisposition in these cases.

SHOEING.—Horses are shod on the usual recognised principles, but I observed that the fore-shoes of draught horses were made longer than usual, and were thickened at the heels, it was said, with the idea of assisting the horses going down-hill. I visited some shoeing forges with a view to gain any hints as to any plans which might be adopted to shoe troublesome horses. I could however learn nothing special. Unbroken colts were not sent to the forge; they are handled and broken first and then shod afterwards.

HINTS &c —I was always on the alert to pick up any hints I could, but I was only able to gain a few.

Fresh horses that have never been stabled, when brought up are often shy of lying down in their stalls, although they lie down regularly in the runs or paddocks. To overcome this, and with the idea that it is the straw used for bedding that they are unaccustomed to, the horses are rubbed with straw and sometimes a straw band is tied round them. I was also told of a curious plan which has been found to be efficacious—that of rubbing fine dry sand into the back of the horse which persistently refuses to lie down; horses thus treated are said to shake themselves, to crouch, and eventually to lie down, the rubbing in of the sand sometimes has to be repeated several times, but in the end the object is gained. I also saw a simple and effectual appliance for the prevention of the recurrence of capped elbow, which consists of a leather pad made to fill the hollow of the heel, preventing either the heel of the shoe or foot from bruising the elbow when the horse is lying down, and it must be remembered that horses without shoes and horses that have never been shod get these troublesome capped elbows; therefore shortening the heels of the shoe or shoeing with tips, is no certain remedy, but this pad seems to be very effectual. It may not be new, but as I have not seen it before I have added this to my notes.

The handling of fresh horses is commenced by running them one by one into a "crush"* and putting on a hempen halter; half a dozen of these freshly haltered horses are turned into a small yard, loose with their halter ropes dragging; here they walk round treading on their ropes and the ropes of others, and thus they become accustomed to the restraint. Subsequently they are one by one tied to a smooth rounded post where there is room for them to walk round; they pull and rein back till they get accustomed to the halter; they will after this allow themselves to be led by the halter, and are said to be "halter broke;" this is the first stage in the young one's education. I am induced here to make a few remarks on the handling of fresh Australian horses, by which I mean horses that have never been stabled, and are just what I have described as "halter broke." If it is required to do anything with them quickly, it can only be done by strength and determination, for it is necessary to let the horses know at once that they have to do what is required of them, and are not to be masters, to do as they please. It is but little use to speak to them, except to divert their attention, for they are unaccustomed to the human voice, as for caressing, they certainly do not understand this, and any attempt to stroke or pat the neck, would probably be looked upon as a liberty, and would be resented by a strike from the fore-foot, given with the force of a sledge-hammer, and well directed at the supposed aggressor. The life these animals lead till they are stabled, makes them naturally suspicious and nervous, and it is only by time and quiet handling that they become domesticated. I think here it is that the good work of the Remount Depôt is shewn, for during their stay, not only are the horses becoming acclimatized and got into condition for the service, but at the same time they are gradually being handled and partially broken.

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* A crush is, I think, best described, as a simple form of "travis," which for unhandled horses, is erected at the end of, and leading from, a small enclosed yard. The horse is driven in and then the "crush" is closed from behind; when it is desired to release the horse the bars at the back are removed, and the horse simply backs out. There are other more perfect crushes into which horses are led, and are released by an opening at the side, and there is a form in which the horse's head is fixed to a bar in front and two gates close on him which fasten behind.

AUSTRALIAN HORSES FOR THE ENGLISH ARMY.—I have often heard it suggested that the Australian market might be made available for obtaining horses for remounting the English army. There is no doubt that horses to meet all requirements are to be obtained. The risk attendant on the shipment of horses from Australia to England would be so great, that I feel sure that it would not be undertaken as a private venture; if this were the case, both the purchasing of horses in Australia and the shipment to England would have to be undertaken by Government. First, with regard to the purchase, I do not think it would be practicable for Government agents to travel about the country to purchase horses, for they would find themselves in direct competition with dealers for the Indian shipments, as well as for the local market; and I expect the best plan would be found to be to purchase horses from recognized dealers, who would collect horses at any centres which might be fixed on.

With regard to shipping horses from Australia to England, the question is one beset with difficulty; there are many points to consider, one of the first and most important being, perhaps, to endeavour to hit off the best season for the passage across the Indian Ocean, up the Red Sea; and then across the Bay of Biscay and the English Channel. My recent experience of a thirty-day voyage from Australia (Melbourne) to Madras *viâ* the Torres Straits, in a horse-ship (*vide* the following article) assists me in forming the following opinion. Even if favorable freight could be obtained, I do not think it would be advisable to charter a vessel solely as a horse-ship, for I feel confident that, even under the most favorable conditions, the mortality amongst the horses, carried in the hold and 'tween-decks, would be excessive. I would suggest if it is ever seriously contemplated to obtain horses from Australia, that a few experimental shipments be made, and that the horses be taken as deck-loads on vessels which run from Australia to England laden with wool. The deck would of course be housed over, which would be a protection against the heat of the sun, and would also afford some protection against the cold in the northern latitude. But in this way there would always be the extra risk of loss from bad weather. I have shewn above that the best time for horses to leave Australia for India is, in my opinion, October and November; this would just hit off the wool ships, but would take the horses into the extreme cold of the English winter. I have not gone into the financial part of the question, as I have no data to go on; but when the freight, the loss in shipment, (which is calculated at 7 per cent between Australia and India), and the expense of keeping the horses, after they have landed, till they have recovered from the effects of the voyage, are added to the price and incidental expenses before shipment, I expect the cost of each remount, by the time he was drafted into the service, would be excessive, if not altogether prohibitive.

MULE-BREEDING.—I am not aware that mule-breeding has ever been carried out in Australia. I think, however, that if the industry were once established and that a demand was assured, we should soon have a really unlimited supply of these valuable transport animals. I make this as a suggestion being fully aware of the difficulty in obtaining a constant supply of transport animals. As Australia is within reach of India, we might possibly look to that colony to supply, at any rate, a portion of the mules, for the mountain batteries, and the Indian transport and commissariat.

NOTES ON A VOYAGE IN A HORSE-SHIP FROM MELBOURNE TO MADRAS VIA THE TORRES STRAITS.

BY

VETERINARY SURGEON (1ST CLASS) W. S. ADAMS.

I timed my leave to Australia, so as to be able to return to Madras, by the S. S. "*Bancoora*," which was chartered to leave Melbourne with horses, on July 21st. This was an exceptional chance, which I was fortunately enabled to avail myself of. As I expect I am the first member of the Army Veterinary Department, who has travelled with horses under similar conditions, I have made full notes on all points of interest.

SHIP.—The British India S. N. Co. S. S. "*Bancoora*," 2,880 (gross) tonnage, chartered by Mr. Madden and Mr. Krcrouse to convey horses from Melbourne to Madras.

ACCOMMODATION.—The "*Bancoora*," is a ship well adapted for the conveyance of horses, having good width of beam, large hatchways, and from being light in the water and in good trim, the lower ports could be opened in fair weather. The horses were placed on deck, 'tween decks, and in the hold below the hatchways. The vessel was ballasted with coal, which made a firm standing for horses in the hold.

FITTINGS.—The special fittings for the accommodation of the horses were strongly made of a hard wood (called "jak" wood I believe). The stalls on deck were 2 ft. 6 in. broad, and were roofed over with dealwood. Those below were 2 ft. 8 in. broad. Each stall had an average depth of about 9 feet. The decks were covered with thin battens for protection, and the stalls were fitted with 5 stout battens of about 1½ inches thick and high, to give the horses foot hold; in addition to which, there was a stout batten running along in front of the stalls, 3 inches high. Each stall was separated by two movable wooden bars, flat with the edges rounded. Wooden movable troughs were used for feeding, which were fitted to the front bar of each stall. It was found advisable to move them as soon after feed as possible, as the horses only fidgetted with them, and by nibbling and biting them, were apt to acquire crib-biting.

VENTILATION.—The "*Bancoora*." as I said before, is admirably adapted for the conveyance of horses, at any rate in the tropics. She has large hatchways fore and aft, and large windsails were used by means of which air was conveyed to parts of the ship away from the hatchways, the lower ports were opened whenever the weather permitted, and the scuttles 'tween decks were fitted with air-scoops, by which means air was driven into the ship by the motion of the vessel. Whenever the sails would draw they were set, and were most useful in driving air into the ship. In spite of every precaution, on a still, hot day, it was impossible to prevent certain parts of the ship from becoming hot and close. The parts most difficult to keep cool and properly ventilated were the extreme bows and stern, and the best ventilated and coolest parts of the ship were the stalls around the fore hatchway, which got the wind from the foresail and got no heat from the engines. Here I sometimes observed a foreward current of air, which reached almost the most forward stall. I think that it was only when the wind struck the sail at a certain angle that this beneficial thorough ventilation occurred. The horses in this part of the ship did the best, there was less sickness amongst them, and no death occurred. The main hatch also got the wind from the mainsail. On the coal, in the hold, beneath the hatchways, were large open spaces used for the treatment of sick horses, for clipping, &c. It will be observed that the ventilation of the ship was entirely carried out on the principle of removing the deleterious gases, by fresh air forced in from without, by means of the windsails, sails and air scoops, and that no dependence was placed on any patent ventilators, which although excellent in their way, and would doubtless be effectual in the cooler latitudes, in a less crowded ship, I am sure would have been of but little service as sole ventilators in a ship. loaded with horses, passing through the tropics. In a steamship the ship is heated by the boilers, and in tropics the sea water is also warm, and the external air often still and hot. Under these circumstances, it is absolutely necessary that the air in the ship should be changed more frequently than is possible by any self-acting ventilators. How the fresh air from the windsail is appreciated by the horses, I saw well exemplified by the manner in which a sick horse, when let loose, in the sick ward, immediately made for the windsail and remained with his nose under the opening. This horse was tired and exhausted by the heat, but after a few days in the open space below the hatchways, he quite recovered.

NUMBER OF HORSES.—The total number of horses put on board the "*Bancoora*," at Melbourne was 391. This is the largest shipment that ever left for Madras and one of the largest which ever left Australia for India.

CONDITION OF THE HORSES.—At the time of embarkation the horses were only in fair condition, as a long drought had been experienced and the grazing had been scanty. It was the winter time and all horses carried their long coats, which, as the horses were in the rough, were very heavy. The horses had been collected from a widespread area, but the majority had been in paddocks, in the neighbourhood of Melbourne, preparatory to embarkation, but those from Gippsland were shipped at once on arrival. It was very cold and wet on the days of embarkation, and the horses brought from Gippsland had a wet cold journey by rail to Melbourne.

EMBARKATION.—The S.S. "*Bancoora*," arrived in Melbourne on Wednesday afternoon July 11th, and commenced to load the horses and to take in the feeds, &c., on Thursday afternoon. The vessel was moored alongside the pier, and the horses were walked on board, by means of staging, and from the deck to the 'tween decks and hold, also by staging. The horses were all put on board without accident, and the vessel left at midday on Saturday, July 21st.

STABLE MANAGEMENT.— The stable management on board requires but little description. The whole number of horses was divided into two charges,—fore and aft. Each charge was under two Australian grooms, all excellent men with horses, and under them were the lascars of the ship, who worked with them in cleaning out, feeding, watering, &c. Each horse was furnished with a hempen headstall and leading rope. To this headstall, pillar chains were fastened, the T-shaped ends of which were passed through staples in the stall-posts. This is a simple and excellent arrangement, it is found that the hempen headstalls, not being affected by the wet or heat, always keep soft. When necessary, it was always a simple matter to let a horse loose and he still had the head rope on.

Daily cleaning the stalls.— All the stalls were thoroughly cleansed every morning and the floors spinkled with slaked lime. This was accomplished in a very systematic manner from end to end. Two or three horses were taken from the stalls at one end, these stalls were cleansed, then the bars having been removed from the adjacent stalls, the horses were moved up as the stalls were cleansed, and the dirt thrown overboard. When the line was finished the horses from the end at which the work commenced were put into the stalls at the other end. At first the weather being rough and the horses not understanding what was required of them, and the lascars being fresh to the work, it was not till late that the work was finished; but as all got into their work, and the weather became finer, it became a simple matter of routine, and was completed by eight o'clock or a little after. This is, I think, an admirable system, for the horses are by this means shifted daily and the stalls are cleansed from end to end. There was no system of flushing the stalls, the urine is almost entirely absorbed by the dung, and the subsequent sprinkling of lime assists in drying and purifying the stalls. That this system is efficient was well shewn by the fact that an hour after the cleaning out had been completed, on a fine day, when there was any breeze, there was but little smell in any part of the ship; whereas, I am informed, that after flushing, it is impossible to dry the decks, and there is in consequence a constant humid, oppressive atmosphere all day; moreover the continued moisture is very injurious to the feet of the horses.

FEED AND WATER.—The horses were watered twice daily at 4 A.M. and 3 P. M. and fed with a mixed feed of oat-hay chaff, and bran, at 5 A.M., noon, 4 P.M. and 8 P.M., at the rate of about half a stable basketful to each horse at each feed, oat-hay was also issued to delicate feeders. This oat-hay is excellent feeding, and is much liked by the horses. The feed is kept in bags in the hold and brought up daily and mixed in large troughs. The bran is excellent wheaten and is very nutritious.

THE VOYAGE.—From Melbourne to Madras *viâ* the Torres Straits, notes as to weather experienced, temperature, &c.

July being the winter in Australia, bad weather is expected across the Indian Ocean, and the gales experienced off Cape Lewin at this season of the year are very severe. It is for this reason that the longer and very intricate passage by the Torres Straits is chosen for the valuable and perishable freight of horses, and by this route fine weather is almost assured at this season.

At the time of leaving Melbourne, it was bitterly cold with a strong wind Immediately the vessel got outside the heads, a strong southerly gale with rain and sleet, and very heavy seas, was experienced; this lasted for about two days till we had passed what is known as "Wilson's Promontory." The temperature stood at about 50°, but gradually rose as we went northward and we got into smooth water as soon as we got inside the "Great Barrier Reef." After we passed through the Albany Pass in the Torres Straits, we got into the Arafura Sea, which is a part much dreaded by horse-ships taking this route, as it is usually very hot and still, and the deaths amongst the horses are numerous. We were, however, fortunate in having a strong breeze from the Gulf of Carpentaria, which kept the ship cool, although it caused her to roll. This rolling is very trying to the horses, it makes them sweat, and tires them, and puts many off their feed, and doubtless many are nauseated by the motion of the vessel. The course was now through the Flores Sea, the Java Sea, by the Carimata Straits to Singapore, thence by the Straits of Malacca, across the Bay of Bengal to Madras. This course is almost along the line of, what is termed, the "Warmth Equator," on which the highest mean temperature is registered. However we did not find the heat extreme, there being nearly always a nice breeze. Some of the horses felt the heat very much, chiefly owing to their long coats; several were clipped, and others had their hair pulled, for it was now falling off, many below were much distressed and blowing, but were relieved when brought on deck or to the cooler spaces under the hatchways. The daily variation of the thermometer was very small from this till we reached Madras, the range being only 5°, *viz.*, from 82° to 87°. In the Straits of Malacca, the heat was excessive, the temperature night and day being 86°, and the breeze which had hitherto favored us died off till we reached the Achien heads, the western extremity of the island of Sumatra. One horse, in the after part of the ship, 'tween decks, died almost suddenly from heat apoplexy; he was apparently well in the morning, having eaten his feed, at 11 o'clock he fell down and died after severe struggles; a second horse died from pneumonia. In crossing the Bay of Bengal we had strong S.W. monsoon winds, and a heavy swell from the S.W., which caused the ship to roll heavily. This was very exhausting to the horses, tired as they were, by the 25 days already spent on boardship; when we reached Madras, on the 30th day, some were almost in a state of collapse. With regard to the rolling, much depends on the trim of the ship, of course she will roll more if light in the water, but for ventilation a light ship has a great advantage. Of course it is a great point to get the horses landed as soon as possible, but the pace can only be accelerated in fine weather. In a heavy sea the vessel had much better be allowed to go easy and to roll over the waves, than to be forced through them, and probably ship heavy seas necessitating the closing of the hatchways, and probably knocking down many horses, on deck. A day or two longer at sea will do less harm to the horses than the shipping of one big sea. These are matters well understood by those accustomed to convey horses by sea, and I only note it here to remark that it is not always the fastest voyages that are the most successful.

SICKNESS.—Taken as a whole, the horses were remarkably healthy during the voyage. The following were the chief cases.

Acute Pneumonia.—Two horses died from "acute pneumonia" on the night of the second day after leaving Melbourne, the disease doubtless being due to the rough, cold weather experienced whilst embarking, and on leaving Melbourne. One other horse had a slight attack but recovered.

Staggers.—During the first few days of the voyage there were three cases of "staggers," doubtless due to the confinement and enforced inactivity on boardship. It is noteworthy that two of the horses attacked were used prior to embarkation, having been ridden hard in driving others to the yards, preparatory to embarkation. Each of these horses was taken below to the open spaces under the hatchways and bled from the jugular vein according to the practice of the owner. All cases did well.

Fever.—There were numerous cases of fever, due to exhaustion, from long continued rolling and to the heat telling on the horses with their long coats. These horses were given a febrifuge and shifted to the cooler parts of the ship. Several were clipped and others had their hair which was falling off pulled, much to their relief.

Apoplexy.—One horse died from what was doubtless "heat apoplexy." He had done well up to now, 25 days out, and had eaten his morning feed. At about 11 A. M he suddenly staggered and fell. Cold water was douched on him, and he was given an ammoniacal stimulant, but he never rose and died in a short time.

Pneumonia.—One fatal case occurred on the 29th day out; on account of the roughness of the weather I was unable to make a *post-mortem* examination. Others shewed evident signs of lung disease, and at the time of landing there were about five cases, two of which subsequently proved fatal. In a paper I sent to the *Veterinary Journal*, I suggested for further enquiry that the fatal cases of the so-called "lungs," which occur amongst horses during the voyage from Australia to India, and from which many succumb after landing, possibly originates in the liver. I then quoted cases in which on *post mortem* examination, I found, although the disease of the lungs was the immediate cause of death, the liver was extensively diseased and enlarged. As shewn above, there were two fatal cases of pneumonia, pure and simple, and it must be noted that these occurred at the very commencement of the voyage, and the disease was directly attributable to the severity of the weather. From that time there was no case till the last few days of the voyage, and not one which might not have been associated with disease of the liver. The condition of enforced inactivity in a heated atmosphere largely impregnated with noxious gases, is one in which either the lungs or liver or both organs would be prone to disease. As the cases occurred towards the end of the voyage, I am more than ever of opinion that it is when the liver has become diseased, that the lungs become secondarily affected, but this is a matter of pathological study. However it may be, the result is the same, extensive disease of the liver and lungs, and the cause is prolonged residence in a heated atmosphere, surcharged with noxious gases, whilst in a state of quiescence, and anything that can be done, to mitigate these deleterious influences will lessen the mortality. The shippers are quite alive to the importance of the thorough cleanliness of the ship, and the most perfect ventilation possible. The mortality on the present voyage was remarkably low, considering the large number of horses on board, and thirty days is a long time for horses to be standing on boardship, especially during a voyage through the tropics. The voyage was favorable both as regards smoothness of the water and also in having, for nearly the whole passage through the parts of extreme heat, good winds which kept the air moving through the ship. Captain Brown, commanding the S. S. "*Bancoora*," who has had great experience in conveying horses, was always on the alert. to take any advantage of any opportunity to get air into the ship. by sails, windsails and ports, and if necessary by altering the course of the vessel for a short time. At this season of the year, the shorter passage across the Indian Ocean *viâ* Cape Lewin is almost impracticable on account of the bad weather, which is considered almost a certainty. I am informed that a vessel left Australia for Colombo shortly before we did, with a small shipment of horses, and the loss was 25 out of a total of 105 or a per-centage of 23·8. I have no particulars as to the cause of this excessive mortality, but I expect it was due to bad weather and the necessarily closing of ports and hatchways, and to accidents.

Refusal of Feed.—Many horses go partially or wholly off feed during rough weather, and as there is no other symptom of ill health, I have no doubt that the horses become nauseated. However, I think a good deal of the refusal of feed is due to the discomfort the horses experience, especially when the vessel is rolling, for then they have great trouble in keeping their noses in the feeding troughs, and some after trying a few mouthfuls appear to become disheartened and give it up, as if it was not worth the trouble. It is very pleasing to notice how the horses cheer up when the vessel passes into smooth water; they then paw and neigh, as usual, at feed time, and soon get on their feed again. On a still hot day many horses go off feed, but this is usually associated with more or less fever, which may or may not be premonitory of disease of the liver or lungs, but which often passes off after the administration of a febrifuge and a change to a cooler stall.

Retention of Urine.—This is common, especially at the commencement of the voyage and during bad weather, and arises from strangeness of position and from the horse being unable to place himself in his accustomed attitude. From long retention of urine the bladder becomes paralysed; horses so affected are found to be uneasy and in pain and urine often dribbling from the urethra. These cases are only relieved by the use of the catheter, which shippers have found from experience to be a very necessary addition to their medicine chest.

Phrenzy.—I will relate this case, although I do not think it was due to life on boardship. A thorough-bred, entire horse, usually a very docile animal, on the 22nd day out, had a very curious attack of "phrenzy" or "mad staggers." His eyes stared; he kicked and bit violently, seizing his feeding trough with his teeth and shaking it; he threw himself down, and plunged and reared, fighting with his forefeet and seemed to endeavour to break out of his stall, fortunately everything held and, with the exception of badly chafing his off quarter and cutting his head, he did little harm to himself and none to others. Cold water was thrown on his head and spine, and after the attack had passed off the horse was much exhausted, and sweated profusely. Having been well rubbed dry, he was given a fever drench and a bran mash. I saw this attack from the commencement, and I am sure that it was brought on by bad temper and excitement, as were three subsequent attacks. All occurred at feed time, and it was during the horse's impatience for his feed that the attacks came on; he was standing in a position where he would be about the last to get his feed. Afterwards it was arranged to feed this horse as soon as the feeds were ready, and he was blindfolded. As all the attacks occurred in the afternoon, I expect the heat had its share in the cause.

ACCIDENTS.—There were really no serious accidents during the whole voyage; this, considering the unbroken and almost unhandled condition of the majority of the horses, speaks highly for the fittings, and for the general management of the horses on board. One horse sustained a lacerated wound on the side, which healed without ill effect. A second received a severe lacerated wound on the cheek, severing a branch of the sub-maxilliary artery. It bled profusely and the bleeding was with difficulty stopped by the application of tincture of iron. This case did well. The fittings were stoutly made, and there was no accident due to the giving way of any, although real bad weather was experienced. After we had been a few days at sea and got into smooth water, the horses began to get very mischievous and cross, biting and kicking at one another, especially at feed time; the bars between the horses were frequently knocked down, being lifted out of their slots. I think some improvement might be made in fixing these bars. I would suggest that the end of the bar at the back of the stall be fitted into a hole in the stall-post, and that the slot in front be fitted with a key, so as to prevent the bar from being moved till the key is lifted. It is very necessary that these bars should be readily taken out, not only for cleansing, but in case of sickness or a horse being accidentally thrown down in bad weather. By this constant kicking many horses had their hind limbs contused, but not so much as would be expected and no serious accident occurred.

DISEMBARKATION.—Disembarking horses at Madras is a curious experience, and the process is worth a full description. At the side of the vessel, on deck, a triangle is fixed made of stout rounded spars lashed together; at the apex of the triangle bags of feed are placed to form a pad, the horse to be landed is then, having previously been blindfolded, led up the triangle, till his chest is against the pad at the apex; his head is here tied down and the slings adjusted, a long rope is attached to the horse's head and passed to the man already in the boat alongside to receive him. A description of the boat used to convey the horse to the shore, and of receiving him in the boat, from the ship is necessary.

The *massulah* or surf boat, which is used is large, very buoyant and high in the water. The planks are sewn together by coir rope, the boat is pulled by a number of men who use very primitive paddles and sit on cross pieces of wood on a level with the gunwale of the boat. Two men receive the horse when lowered into the boat, one of whom is in the boat and the other on a catamaran alongside. When the horse is lowered into the boat its head is firmly tied down by a rope on each side. It is a matter of considerable risk, especially in bad weather, as the movements of the boat and rolling of the ship renders the lowering of the horse a very ticklish business for those in the boat to receive him, and for the boatmen. After the horse is lowered and properly secured, the boat is rowed to the shore; there it is beached and turned on its side, the horse either jumping out or tumbling out on to the beach. The horses are thus collected and marched to the stables in batches of about a dozen, in charge of a man mounted on a quiet horse.

The whole of the horses for Madras, 375, were landed, in this way, in fourteen working hours; this is a "best on record." The fact that this was accomplished without accident speaks very highly for all concerned. The quiet and efficient manner in which the work was carried out was very remarkable, the only noise and shouting being made by the boatmen, who seem to lead a life of continual squabbling, and were now fighting their way to the ship's side for a horse, and then having taken one ashore, they would begin to fight again to get another.

I.

CAVALRY FORMATIONS.*

BY

Major J. P. C. Neville, *14th Bengal Lancers.*

In Vol. XVIII, No. 75, of the Journal of this Institution Captain Stockley, 16th Bengal Cavalry, sets forth some ideas on cavalry formations and training with a view, as he says, to evoking argument. I do not think that the first part of his paper admits of much argument, as most of the points at issue have been already decided, but I will record the following thoughts which occurred to me at the time of reading his article.

Single rank not a new idea.

The formation of cavalry in single rank is no new idea. It is one that has cropped up again and again during the last century and a half, and has always been condemned in theory and practice by those best qualified to judge.

It's apparent avantage over-balanced by necessity for cohesion in attack.

The necessity for cohesion in the shock of the cavalry encounter is so great that any formation that tended to militate against this element, would require in it's favor far greater advantages than any Captain Stockley can offer to secure for it even a hearing.

Use of the rear rank.

The rear rank is intended to fill up the gaps caused in the charge by casualties, opening out, &c., so that a continuous and unbroken line of lances or sabres may be opposed to the hostile line at the moment of the shock, when, *cæteris paribus*, the line with the greater amount of cohesion will be victorious.

It is not necessary, except for reviews, &c., that front and rear ranks should be man for man of equal strength, but when it is borne in mind that one of the worst faults of our best cavalry at the present time is the want of cohesion—the opening out, *en débandade*, of the squadron during the charge, it will be seen that if the double rank fails to secure this *sine quâ-non* of efficiency, a single rank formation is not to be thought of.

Moral effect of two ranks.

There is however another use for the rear rank, a moral one. The front rank men will ride all the straighter and more confidently at the foe if he feels he has a good man at his back. We have all felt this sort of moral stimulant in a row from our school days up, and human nature is much the same as ever.

An idea somewhat similar to that which has struck Captain Stockley, has before now induced some to advocate an armament of lances in the front rank only.

This is now very generally condemned. It is very nice and pretty on parade, but on service when casualties and gaps have to be filled up it results in a line of unequal strength, the lance being a far better weapon for attack than the sword.

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* *Vide* Journal of the U. S. Institution of India, Vol. XVIII, No. 75, page 108.

The filling up of gaps.

This filling up of gaps is a thing that wants practising, and I have never seen it done. Men, on the contrary, of the rear rank are not unfrequently dropped on if found in the front at the end of a charge.

Proposed practice.

The practice might be carried out as follows—a line advancing at a smart trot:—On the trumpet sounding one "G," all No's. 1 of front rank fours gallop on ahead and disperse, their places being quickly filled by Nos. 1 rear rank. On two "Gs" sounding, No's. 2 in like manner vacate their places which are similarly filled, and so on until the whole front rank is dispersed, and the rear rank arrives unbroken at the boundary of the parade.

The half-troop or division drill.

The ideal squadron.

Disadvantage of two formations of squadron.

To go on with Captain Stockley's remarks. The half-troop or division drill has already been introduced and practised this last drill season with good results. There is one drawback however to the present system which deserves notice, and that is a superabundance of leaders in front of the the squadron during the attack. The ideal squadron for attack is one that requires no leading, but which, the troopers riding knee to knee, falls on the enemy *en muraille.* Every man in front of this ideal line is a disadvantage as he himself is of little use, while he impedes the man or two (perhaps three) behind him. Unfortunately even the best of cavalry requires a lot of leading and the squadron that will charge by itself has yet to be found, but the principle still holds good that the fewer leaders in front, having due regard to *efficient* leading, the better. With two troops there were five men in front of the squadron (including the trumpeter), in the present division drill there are six, and I think that number too many. It would be an improvement if on the word "The line will attack" the outward division leaders took post on the outward flanks of the squadron, the remaining two becoming troop leaders* during the charge. Why lay down a fixed rule as to the number of men to form the front rank of the division? No doubt it is desirable that there should be a minimum (say 12 file) in the point of view of manœuvre, but it is undesirable to revert to the old formation of two troops when numbers fall short, as (especially with natives) the utmost simplicity in all parade work is to be aimed at. If divisions are the best formation let us have divisions; if troops, troops, but let us by all means stick to one thing or the other. At present when the squadron turns out strong it is formed in divisions, when weak, in troops, and this is confusing.

Division leaders in column.

It seems to me a mistake for division leaders to ride on the flanks of their divisions in column. They should be in front of their divisions, whence they can work their commands to either hand without the confusion that is now seen.

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* That is, riding in the position formerly occupied by troop leaders.

For example, a line of squadron columns (of divisions) advancing, the division leaders on the left flank. The commanding officer wishing to take ground to the right, sounds "Troops right wheel"; the divisions wheel into line to the right and *leave their leaders in rear.* I have seen this happen.

Should be in front of their divisions and not on a flank.

The leaders should be in front. It is easier for them to lead so, and for the men to take notice of their signals, as verbal commands are prohibited. The idea seems to be that there is not room for them, but there really is, or ought to be, for if the formation is to have the pliancy that is its' *raison d'etre*; there must always be more than the theoretically correct distances between divisions, otherwise "wheels about," even at a walk, cause confusion and "clubbing."

The question of armament.

To go on to the proposed armament. There is no doubt that, within limits, the more weapons you give a man the more confident he will feel, but in a multitude of weapons there is not that safety that might at first thought be surmised.

The White Knight, in "Through the Looking Glass" was lavishly equipped, even to bee-hive and mouse-trap, and yet he was not an efficient cavalier.

The country bred horse as a weight carrier.

No, besides the weapons skill is required in their use and a horse able to carry them all. The latter consideration is serious. The average country bred horse of the native cavalry is not a weight-carrier by any means and any addition to his present load is a subject for grave debate. What is the use of the weapons if the horse breaks down? It is true that a revolver is not a great addition in weight even with 10 or 20 rounds of ammunition, but still it is something,—some 5 lbs. or so, and may be the proverbial "last straw." Putting the question of weight aside however, the policy of arming cavalry (especially native cavalry) with this weapon is open to serious objection. For a detached man the revolver is very suitable and might often be the saving of a scout's life, but fancy the free use of it in a *mêlée*! Imagine after the shock of a charge, the sowar, a little flustered, as he is apt to get at times, shooting loose in a circle! No, I am not in favor of the indiscriminate issue of revolvers, though perhaps if given to a few picked men, well mounted, who might be specially instructed and trained for scouting and reconnaissance, it would be a good thing. As the subject of scouting has been mentioned, a few words thereon may not be out of place. In the British cavalry, all the troopers are more or less intelligent and educated; the great majority can read and write and can be depended on to carry out intelligently and carefully the orders given them. On this account there is no difficulty in these regiments about scouting and reconnoitring: a man may safely be taken at random from the ranks and entrusted with the most important duty.

The revolver unsuitable for rank and file.

But perhaps an advantage for scouts.

Scouting and reconnoitring.

Proposed plan of instruction.

This is not the case with natives. The great majority are uneducated and of such a low scale of intelligence as to be almost incredible to those who have not had to do with them. For scouting duties, except perhaps "ground scouting," the majority are useless. This is a great drawback to the efficiency of native regiments. It is true that the smartest men in troops are told off as scouts, but that is not sufficient, and I would suggest some such plan as the following.

Four men a troop to be selected from the most intelligent. They should be good strong riders and specially well mounted, having the pick of the troop horses. They should be taught to read and write fluently so as to be able to send in reports, &c.: they should be specially trained in the use of arms and might be equipped with the revolver as before said, so as to give them confidence and boldness when detached. One of the four in each troop should be a duffadar or lance-duffadar. These men not to be employed as ground scouts but for more important duties at a distance. Method of training. A "scout class" to be formed in each wing. School work (reading and writing) to be carried on synchronously with field work. Two days a week to be devoted to the use of arms, &c., until proficient. Two days to lectures on scouting and reconnoitring duties with examinations. As soon as all the men are proficient, the two classes to be formed into one and exercised in their duties as if on service. In this way, in—say six months—the regiment would have 8 non-commissioned officers and 24 men to be depended on as reliable.

Some inducement would probably be necessary, either extra pay or hope of promotion, to encourage competition for the appointment of scout, and, once the system in working order, the "Scout Duffadars" of troops might carry on the instruction of candidates to fill places vacated by promotion or other causes.

Pioneers.

Russian superiority in this respect.

The establishment of a well trained and equipped body of pioneers in our cavalry regiments is greatly to be desired. A glance at the table of equipment at the end of the paper on the Russsian Cavalry in the same No. of the U. S. I. Journal, will show the difference between their efficiency in this respect and ours.

Demolitions, &c.

It seems a pity that the instruction in demolitions, &c., given to officers at garrison classes should be merely theoretical. If the officers were practically taught the use of gun-cotton, fuzes, breaking up rails and down telegraphs, &c. &c., they might be able to instruct their men in this most important branch of cavalry training.

Captain Stockley advocates the abolition of the crupper. It has been abolished some years.

The theory of an over-lapping front line unsound.

He goes on to mention as one of the advantages of a single rank formation, that a long line would outflank and envelope the enemy.

Cavalry *versus* mounted infantry.

Mounted infantry can never oust cavalry from its own sphere of action. The former has its own special organisation and *rôle* to perform; it can keep pace with the advanced bodies of cavalry and quickly afford them support when pressed by superior force, it is armed with a long range weapon and can make itself felt at a distance, while at close quarters it is useless. So soon as mounted infantry attempts to play at being cavalry it will come to grief. The dismounted duties of cavalry are simple enough, what is really wanted is more practice in long range volley firing, both at fixed targets and at moving and vanishing screens. These practices should be at ranges from 900 to 500 yards, never less, for as soon as his enemy is within that distance the cavalry soldier must make for his horse and be ready to get to close quarters if possible.

Training.

The course of training proposed seems to be nothing more than that already prescribed by regulation and presumably carried out more or less by all regiments.

Tent pegging, &c.

Tent pegging and lime-cutting should of course be practised by all ranks. I have never heard of their being unpopular, though Captain Stockley seems to have been more unfortunate in his experiences. At any rate compulsion will not increase their popularity, judicious encouragement is what is wanted and then the great danger is that they will become so popular that their practice will have to be limited to once a week at the most. Some men of course are too lazy to turn out in the afternoon with the prospect of having to clean all their saddlery again before night and some too may try to excuse themselves by saying that their horses will not face the "run." To the latter the only retort is "Then you must teach your horse, and, until he learns, *your* attendance is compulsory." The idea of keeping an elaborate register of each man's performances at these practices and giving prizes for the aggregate marks made in a month does not commend itself to my mind. The men appreciate rewards given at once, and such a system is less troublesome and altogether more satisfactory. The prizes should not be large, so all the more reason for giving them as soon as earned.

II.

CAVALRY FORMATIONS.*

By Lieutenant R. G. Egerton, *Queen's Own Corps of Guides.*

Single rank or double rank.

The advantages of single rank over a double rank formation are open to doubt. It may perhaps be admitted that a rear rank at one horse's length distance only can hardly be of use in overcoming such bodies of the enemy as may break through the front rank at different points. One writer on cavalry formations and organisation has advocated the retention of the rear rank but would always form it at a greater distance, and this appears to have much to recommend it during the long advance in line which must precede the charge and also in the latter itself; but such a formation would only seem to unnecessarily complicate other field manœuvres to which it is not suitable. I would suggest therefore, that so soon as line is formed preparatory to the charge the rear rank should reduce its pace, (the *serrefiles* coming round by the flanks to lead it on) until the front rank has gained a distance of at least 30 to 50 yards.

Captain Stockley advocates that a squadron should be limited in front to 80 men in single rank, all in excess of this number to ride as *serrefiles;* as the excess would be over half the strength of the front rank (50 men at least) the idea of single rank explodes. Perhaps, however, he means to increase the number while diminishing the strength of squadrons, but where are his extra squadron leaders to come from? more especially as each of the four divisions of each squadron would presumably require an officer to lead it.

Squadron intervals.

Again he advocates the increase of the squadron interval from 12 yards as at present to 20 yards when squadrons are at full strength (80 men). Now the present interval is supposed to be gradually filled up before the actual charge so as to have an unbroken line and very difficult it is to fill it up properly, what then if the interval were nearly doubled and the line at the same time made less solid and therefore less expansive? To arm every cavalry soldier with four distinct weapons would add a great encumbrance to the horses already in many cases over-weighted, besides entailing such a prolonged and irksome course of training that service in the native cavalry would soon become as unpopular as several anonymous writers in daily newspapers have lately been asserting that it already is.

Horse equipment.

Until some means are devised by which a supply of saddle trees of various shapes can be kept on stock by native cavalry (without expense to the men) so as to fit all sorts and conditions of horses, cruppers and breastplates are requisite for many if not most horses to steady the saddles especially when working over broken ground.

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* *Vide* Journal of the U. S. Institution of India, Vol. XVIII, No. 75, page 108.

Cavalry *versus* mounted infantry.

Mounted infantry can never oust cavalry from its own sphere of action. The former has its own special organisation and *rôle* to perform; it can keep pace with the advanced bodies of cavalry and quickly afford them support when pressed by superior force, it is armed with a long range weapon and can make itself felt at a distance, while at close quarters it is useless. So soon as mounted infantry attempts to play at being cavalry it will come to grief. The dismounted duties of cavalry are simple enough, what is really wanted is more practice in long range volley firing, both at fixed targets and at moving and vanishing screens. These practices should be at ranges from 900 to 500 yards, never less, for as soon as his enemy is within that distance the cavalry soldier must make for his horse and be ready to get to close quarters if possible.

Training.

The course of training proposed seems to be nothing more than that already prescribed by regulation and presumably carried out more or less by all regiments.

Tent pegging, &c.

Tent pegging and lime-cutting should of course be practised by all ranks. I have never heard of their being unpopular, though Captain Stockley seems to have been more unfortunate in his experiences. At any rate compulsion will not increase their popularity, judicious encouragement is what is wanted and then the great danger is that they will become so popular that their practice will have to be limited to once a week at the most. Some men of course are too lazy to turn out in the afternoon with the prospect of having to clean all their saddlery again before night and some too may try to excuse themselves by saying that their horses will not face the "run." To the latter the only retort is "Then you must teach your horse, and, until he learns, *your* attendance is compulsory." The idea of keeping an elaborate register of each man's performances at these practices and giving prizes for the aggregate marks made in a month does not commend itself to my mind. The men appreciate rewards given at once, and such a system is less troublesome and altogether more satisfactory. The prizes should not be large, so all the more reason for giving them as soon as earned.

II.

THE RUSSIAN CAVALRY IN 1888.

COMPILED BY SUB-CONDUCTOR J. J. KÖNIGS B. U. L. *(Continued.)*

Pay and allowances of officers.—The officers receive their pay monthly in arrear. All ranks have two scales of pay, namely, normal pay (in peace) and increased pay (in war).

Deductions are made from the pay of all officers, whether on the active or supernumerary list, the former paying 2½ per cent. as a subscription to the sick fund, and 6 per cent. to the pension fund, the latter paying 2½ per cent. to both the sick and the pension fund. The subscription to the sick fund gives officers the right to be attended *gratis* in the Imperial hospitals.

In addition to their pay officers receive allowances, such as lodging, messing, forage, travelling, servant and ration allowances, the last only in time of war.

The annual pay of the officers is as follows:—

	Guard Cavalry.		Line Cavalry.	
	Normal.	Increased.	Normal.	Increased.
	Roubles.	Roubles.	Roubles.	Roubles.
General	1,850*	2,775	...	...
Lieutenant-General	1,480	2,220	...	...
Major-General	1,110	1,665	...	...
Colonel	750	1,125	750	1,125
Lieut-Colonel	...	...	580	870
Captain	580	870	400	600
Staff Captain	480	720	370	555
Lieutenant	400	600	340	510
Sub-Lieutenant	370	555	320	480
Ensign (of the reserve)	340	510	300	450

As the rate of exchange varies constantly, all pay &c. is, in this article, given in roubles and kopecks; 100 kopecks = 1 rouble. A good rough rule is to allow 10 roubles to the pound sterling.

Pensions for Officers.—The pensions received by officers on leaving the service are of two kinds, State pensions, and those derived from the Pension Fund, or Caisse Eméritale.

The amount of pension accorded to an officer, or, on his death, to his family, varies, 1stly, with his length of service; and 2ndly, with the number of years during which he has contributed to the fund.

For officers who have always contributed, the following is the scale: after 35 years' service, full pay; over 25 and under 35 years' service, half pay. No pensions are given to officers who have contributed for less than five years.

In case of wounds or incurable disease, the pensions of officers, whatever be their length of service, are calculated in every respect on the same scale as those of officers who have completed 35 years' service. The rates of pensions of the Guards are somewhat higher than those of the Line.

N. C. Officers and Men.—The pay and allowances of non-commissioned officers and men include the following:—

Pay.
Mess allowance.
Rations in kind.

The pay of the non-commissioned officers and men is reckoned for the year, and the amount is handed to them every three months in arrear. It is paid to the men by the squadron commander in presence of the other officers, and of the sergeant-major.

There are two scales of pay, namely the ordinary and increased pay. Increased pay is given to the men when their officers receive it (see above). No deductions are made from the men's pay. The following table shows the two kinds of pay.

Rank.	Ordinary Pay.		Increased Pay.	
	Guard.	Line.	Guard.	Line.
	R. K.	R. K.	R. K.	R. K.
Sergeant Major	36.0	24.0	54.0	36.0
Senior Sergeant	24.0	18.0	36.0	27.0
Junior Sergeant	16.95	4.80	32.70	9 30
Trumpeter	16.95	4 80	32.70	9.30
Lance Corporal	10.65	4.5	20.55	7.80
Private	7.35	3.45	14.25	6.60

Instead of the rations of fresh meat and brandy, which formerly were issued, both in peace and war, the non-commissioned officers and men receive a mess allowance.

The mess allowance is calculated to give every man ⅓ lbs. of meat on each of the 196 days of the year on which the consumption of meat is permitted by the Greek Church, the remaining 169 days are fast days. The men get two warm meals a day, at noon and in the evening.

The men receive, in addition to their pay and mess allowance, certain rations in kind, but they are not supplied with bread like other armies. This is baked by the men themselves.

The daily ration in kind includes:—

Flour, 2 lbs. 0¾ oz., or 2 lbs. 11½ ozs baked bread, or 1 lb. 13. oz. biscuit, per man.

Groats, 4⅘ ozs. per man.
Salt, ⅘ oz. per man.
Tea 11 $\frac{7}{10}$ oz. and sugar, 2 lbs. 3$\frac{3}{10}$ oz. per 100 men.*

Flour is generally issued, but as a rule it is not all baked into bread or biscuit; a large proportion of it is saved in each mess and sold, other articles being bought with the proceeds to improve the messing.

Besides the bread, a beverage called "kvas" is prepared from the flour and leaven, and drunk at meal times. Salt meat is not used in the Russian service; when on the march, the men buy meat in the villages, or drive cattle along with them.

The company mess is in charge of an "Artelshtchik," who purchases provisions with the funds entrusted to him. He is elected by the privates from their own number, and holds his office for six months.

The Guards and regiments quartered in the Caucasus, Turkistan, Siberia, and the Orenburg military districts, are given kitchen gardens, and, in order to improve the condition of the troops, it is customary to grant furlough to men to go and work for wages. This is done in summer at the end of the drill season, the only restriction being that a sufficient number of men shall remain in the garrisons to do the necessary work. Of the money earned one-third goes to the squadron mess fund, on third to the workman, and one-third is divided amongst the whole squadron.

The daily scale of rations for a soldier in time of war is:

Biscuit...	1 lb. 13 ozs. (or flour, or bread as in peace.)
Fresh meat	7¼ oz., or 3⅝ oz., ham.
Groats	4⅘ oz.
Salt	⅘ oz.
Tea	$\frac{9}{40}$ oz.
Sugar	$\frac{9}{20}$ oz.
Spirits	0·27 pint.

Pepper ($\frac{3}{80}$ oz.) and vinegar (0·18 pint) may be issued when ordered by the Commander-in-Chief, who also orders the issue of meat or spirits, these not being included in the daily ration. Troops stationed in Saghalien always receive field rations.

Fuel and light are issued to troops in barracks on a summer and a winter scale. The fuel on the former scale is calculated to furnish what is necessary for cooking: on the latter, the additional amount required for heating.

Lights are only issued when the troops are on the winter allowance.

Pensions.—In time of war, and in peace for a limited time, a householder is bound to supply men billeted on him with quarters, fuel for heating and cooking, and with light *gratis*. In towns where troops are permanently billeted on the inhabitants a fixed sum is paid, and for this purpose the towns are divided into twenty classes. The sums paid per man per annum vary from 5 roubles to 20 roubles; the rate for troop horses of cavalry is 5 roubles per stall per annum. Since the introduction of short service, pensions are only granted to men who have contracted wounds or disease in the service. These men receive 3 roubles a month. Should they require the attendance of another person, the amount is doubled.

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* 14½ oz. tea, 11½ oz., sugar per 100 men in Transcaspia.

Assistance is likewise given by the Government to the families of men killed in action. The municipal authorities have to assist the families of men belonging to the reserve who are drafted into the ranks of the field troops. Lastly, the committee for aiding the wounded gives pensions, procures admission to the Tchesma and Ismailov alms-houses, and obtains employment for the wounded and maimed, according to the extent of their injuries.

Promotion of Officers.—Promotion during peace is made by the Emperor. In time of war the Commander-in-Chief of the army in the field has the power to promote the officers under his orders, subject to the subsequent sanction of the Emperor. In the cavalry promotion up to the rank of captain goes by seniority, the officers being promoted in their own regiments.

Promotion from the rank of sub-lieutenant to that of lieutenant is given after a service in the former rank of four years, but this rule may be disregarded for distinguished service in the field. Lieutenants and sub-lieutenants attaining the age of 55 years and not promoted are retired.

Promotion to staff-captain and captain is given as vacancies arise but there is no limit of age at which captains are retired.

For promotion to field rank there are established the following lists of captains:—

Guard cavalry.—One list per regiment.

Line cavalry.—One list for the whole of the regular cavalry.

In the cavalry the conditions of promotion are, that the candidate is physically fit and has passed the cavalry officers' school.

Officers, in all arms of the service, whose turn it is for promotion by seniority, and who are considered unfit for such promotion, are retired or transferred to the reserve.

Cavalry lieut.-colonels are promoted on the same lists as those given above, by selection entirely, and, in time of peace, only as vacancies occur. The conditions are that candidates should be physically fit and not more than 55 years of age, that they should have 15 years' total service as officers, and that four of these should have been in the rank of lieut.-colonel. Lieut.-colonels of over 60 years of age are retired.

Promotion to the rank of general officer goes entirely by selection.

Promotion of N. C. Officers.—Officers in command of regiments have the power of promoting soldiers to non-commissioned rank on the recommendation of their squadron commanders as vacancies occur.

For the purpose of enabling squadron commanders to exercise a wise choice, in every squadron there is formed yearly a "Squadron School" of not less than 12 privates, of whom two-thirds are young soldiers of the previous years' contingent, who have finished one course of summer drills. One of the junior sergeants of the squadron is appointed instructor, and the squadron commander is responsible for the instruction being properly given. The course lasts from the end of one summer drill-period to the beginning of the next. At the end of each summer drill-period an instructional detachment is formed in each regiment of a strength equal to at least half the total number of non-commissioned officers in the regiment, and formed of men who have passed through the squadron school and who are of exemplary character and likely to make good non-commissioned officers. The course lasts from one summer drill-period to another, but not more than 16 lessons a week are given. The subjects of instruction are drill, riding, theory of musketry, fencing, gymnastics, duties of the soldier, disciplinary powers, organization of the army, supply of rations, pay, keeping of accounts, writing reports, and map-reading. The instruction detachment is always quartered at regimental head-quarters, and is under a specially selected officer, who has one other officer as assistant. The detachment is inspected in spring by a board consisting of the regimental commander and members nominated by him from the squadron commanders. On successfully passing the course, the men may expect to be promoted as vacancies occur, if their further conduct justifies their promotions.

Privates are not eligible for promotion unless proficient in fencing.

Military Decorations.—In time of peace officers can receive the crosses of St. Stanislaus, St. Anne (there are three classes of the orders of St. Stanislaus and St. Anne), the White Eagle, St. Alexander Nevski, and of St. Andrew. These form an ascending series, of which the last mentioned is the highest.

The Cross of St. Vladimir of the 4th Class, with a rosette, may be conferred on officers of 25 year's service, who have seen active service, and the same cross, but without a rosette, on all officers of 25 years' service. After 40 years' service an officer receives a medal.

Decorations given for service in the field are similar to those given in times of peace, but have two swords crossed on the back of the order.

In addition to the medals given to commemorate a campaign, and which are worn both by officers and men, the following decorations can be bestowed on non-commissioned officers and men:—

1.—The medal of St. Anne.

2 —The military order, and adjunct to the order of St. George. Of the latter there are four classes.

A pecuniary reward accompanies these decorations in the case of non-commissioned officers or men, but when an officer receives a cross (except for service in the field) a deduction is thenceforward made from his pay. The sums thus stopped are paid into the funds of the order, to be devoted to charitable objects.

Non-commissioned officers, on completing 10 years' service, are given the silver medal "For zeal;" on completing 20 years' service (of which 15 must be as a non-commissioned officer) a silver medal, worn round the neck; and on completing 25 years' service, a gold medal, similarly worn. The two latter medals are also marked with the inscription "For zeal'

Discipline.—Minor offences only, such as result from negligence rather than from bad conduct, may be punished summarily.

The senior officer or non-commissioned officer of the same rank, or one of a higher rank, is in all cases to be regarded as the superior, but he has no disciplinary powers over a junior unless the latter is officially subordinate to him.

A superior is bound, nevertheless, to reprimand all who commit minor offences in his presence, and, in more serious cases, or if the offender is refractory or unruly, to place him in arrest.

One and the same offence can be punished only once summarily, but should the offence prove subsequently to be of a serious nature, it can be inquired into by a military court, and punished accordingly.

Punishments of N C. Officers and men.—The disciplinary punishments which can be inflicted on non-commissioned officers and men are as follows:—reprimands; confinement to barracks; extra turns of fatigue and other duty not exceeding 8 days; confinement to the guard-room for a period not exceeding one month (no spirits or tobacco allowed, singing and conversation with comrades also forbidden); solitary confinement on bread and water, except every third day, when the ordinary ration is issued; solitary confinement in a dark cell, limited to 8 days; and in extreme cases, one month's imprisonment on bread and water, of which two periods of 8 days, with an interval of 8 days, may be replaced by solitary confinement in a dark cell.

Men already placed on the punishment list by sentence of court martial are liable to corporal punishment up to 50 lashes.

Sergeant-majors and re-engaged non-commissioned officers are liable to reprimand, suspension for 3 months, or reduction, but not to imprisonment on bread and water.

The other non-commissioned officers are liable to the same punishments as privates not on the punishment list, except extra fatigues and dark cells; they may be reduced in rank, either temporarily or permanently, or sentenced to common arrest, or arrest on bread and water.

Volunteers and young soldiers who have only to serve a limited time owing to education, are not, as a rule, employed on fatigues.

Officers' Punishments.—The disciplinary punishments applicable to officers are as follows:—reprimands, either private or in the presence of the rest of the officers of the regiment, or published in the orders of the day; extra turns of duty; confinement to quarters; arrest in the main-guard or in places specially set apart for the purpose, with or without a sentry at the door; suspension from command; and being declared unworthy of promotion. Junkers are liable to the same punishments as subaltern officers.

Officers commanding regiments and those of higher ranks cannot be placed under arrest without the consent of the Emperor.

Regimental Transport.—The regimental transport in war carries only such articles as are required by the unit at each night halt. The stores etc. carried by the regimental transport are replenished from the divisional transport. The regimental transport is divided into:—

(*a*) As regards distribution and packing of stores: (1) squadron, (2) regimental baggage.
(*b*) As regards order of march in the vicinity of the enemy—1st line and 2nd line transport.

The squadron baggage consist of:—

(*a*) All stores and articles of equipment, the number of which is calculated upon the strength of the squadron.
(*b*) The other articles which it is considered indispensable to have always with the squadron.

Regimental baggage consists of:—

(*a*) Articles intended for the general use of the whole regiment.
(*b*) The baggage of the regimental staff.
(*c*) Spare horses.
(*d*) Slaughter cattle.

As a rule, each squadron, or section has its own special carriage or carriages, which accompany it if it is detached. All regimental transport is purely military—men, horses, and carriages.

The baggage of a regiment of cavalry, is divided into two sections and is commanded by a transport officer.

1*st Section.*—1st line baggage under the arms officer.

2*nd Section.*—2nd line baggage under one of the regimental quarter master sergeants.

All regimental transport moves, if possible, with its units, but if this is impossible on account of the proximity of the enemy, it is divided into two lines. The 1st line baggage follows directly after its unit, and is never separated from it; the 2nd line baggage follows at the tail of the column.

1st line baggage comprises:—

All the ammunition carts, one two horse carriage per squadron, all hospital equipment, and officers' spare horses, each carrying 36 lbs. of officers' baggage.

All remaining baggage in 2nd line.

Only men accustomed to the care of horses are detailed as transport drivers, and these are instructed in peace by the commander of the non-combatant squadron, or an officer special detailed. They go through a six months' course of instruction, comprising care of horses, harnessing, driving, packing the wagons, bivouacking or camping, and defending the baggage. They also are put through a course of musketry and guard duties. The artificers, who in war become transport drivers, the clerks, dressers, and all who march with the baggage on active service, are put through a course of transport drill. The commander of the unit is responsible for the instruction of his transport drivers, and general officers have also to inspect them in their particular duties. As far as possible regimental transport is used in the summer camps and at manœuvres.

All transport material, carriages, and harness, is always kept in charge of the unit to which it belongs, and on each carriage is fixed a list of the stores to be packed in it. On its left (near) side is painted the number of the regiment, and squadron, and the weight it has to carry.

Each regiment, also maintains pack saddles and equipment for all stores carried in two horse wagons, and all stores should be so packed as to be capable of being carried on pack-saddles if required. Each unit also keeps in its store the carriages which are to form a portion of the divisional transport.

On mobilization, the number of drivers required is made up from the reserve men, all those previously instructed in transport duty being first taken. Transport sergeants are taken from the reserve sergeants. Horses are obtained by means of the horse conscription. A plan for the mobilization of the regimental transport is always kept ready, and during the mobilization period every opportunity is taken of imparting instruction. The wagons of the divisional transport attached to regiments accompany those regiments until the division is concentrated.

The commander of the regimental transport is in disciplinary charge of the drivers etc., and receives orders only from the regimental commander. He takes all measures to ensure the baggage being up in proper time, and its safety being properly cared for. He allows no men, horses, or carriages, not belonging to it, to accompany the regimental baggage, and allows no non-regulation articles to be placed on the carriages. He superintends the issue of rations to the men and their cooking; the watering, feeding, and shoeing of the horses; the repair of the carriages etc. If an officer, he has the power of a squadron commander; if a sergeant, those of a sergeant-major. The duties of commanders of sections are similar to those of the transport officer. The baggage of a squadron detached from its regiment, is commanded by the quarter-master sergeant.

The regulation amount of baggage for officers (from colonels downwards) is :—

1st line baggage—
  On each led (riding) horse ... ... 36 lbs.
  The choice of articles is left to the officer.

2nd line baggage—
  The rest of the kit, not to weigh (including
    bullock trunk and camp bed) more than 72 lbs.

There are two patterns of transport carriage, the one horse cart (two-wheeled) and the two-horse wagon, pattern 1884.

The weight of the carts and their stores, etc. are as follows :—

	1 horse cart.	2 horse wagon.
Weight of the carriage	415 lbs.	830 lbs.
Tarpaulin	18 lbs.	18 lbs.
For each horse:—blanket, saddle-cover and head-collar, nose-bag, 2 spare fore shoes and nails	10 lbs.	20 lbs.
For the 2 horse-cart:—curry comb, and brush, 70 feet of rope, grease (5 ½ lbs.) spare linchpin, billhook, canvas bucket, hay net	...	22 lbs.
For the 1-horse cart:—as above with 2¾ lbs. of grease and 35 feet of rope	17 lbs.	...
TOTAL ...	460 lbs.	890 lbs.

Each two-horse wagon is supposed to carry 3,635 lbs., each one-horse cart 1,818 lbs.

Regiments of six squadrons carry the following stores, etc. in the regimental transport per squadron.

(*a*) Ammunition, 36 rounds per private armed with a rifle, or in all 4,608 rounds (in 16 boxes of 288 rounds each) per squadron.
(*b*) Tinned rations, 144 lbs. per squadron.
(*c*) Supplies. None in the regular cavalry.
(*d*) Camp equipage, 4 camp-kettles, 1 bucket, 1 ladle, butcher's knife and meat fork, meat dish, 2 handed saw, rope, lantern, candles, measure of 1 garnets, total weight 122 lbs. 10½ oz.
(*e*) Officers' baggage, 2 tents per squadron = 72 lbs.
(*f*) Line gear, 24 large picket posts, 8 small picket posts, 1 picket rope (180 ft. long) = 277 lbs.
(*g*) Eight scythes, 2 hammers, 4 whetstones, etc. = 40 lbs.
(*h*) Four pairs of light panniers for use with pack saddles = 36 lbs.
(*i*) Six pairs of bladders for swimming rivers = 27 lbs.

The above are carried in a 1 horse cart for ammunition, and a 2 horse wagon.

Supply of Ammunition.—The following table shows the supply of ammunition which is carried by the men, that in regimental transport, and that in mobile establishments for an army in the field :—

Carried by the men...	36	rounds	
Carried in regimental transport ...	36	,,	per rifle.
In divisional flying park	37	,,	,,
In mobile parks	10	,,	,,
		,,	,,
Total...	119	,,	,,

Tactical Notes and Instruction of the Cavalry.—Three paces are known in the Russian cavalry, the walk, trot, and gallop. The rate of the walk is 5 versts (3½ miles) an hour, or 111 paces a minute; of the trot 12 versts (8 miles) an hour, or 267 paces a minute; of the gallop 16 versts (10⅔ miles) an hour, or 356 paces a minute. All movements in retirement are made at a trot. Dressing is always by a flank, the flank section commander being responsible for the direction.

The Squadron.—The squadron is drawn up in two ranks at one pace from nose to croup, and told off into four sections. The strength of the section is, in peace or war, 16 files, blank files, if necessary, being left in the centre of the section. Both ranks are told off by threes. A squadron has a front of 64 files. The space occupied by cavalry in line is 5 files to 6 paces, and a squadron in line therefore occupies a front of about 86 paces (including sergeants on the flanks of each section). Its depth, including section leaders and *serrefile* rank, amounts to 15 paces.

The place of the squadron leader in line is the length of one section in front of the centre of his squadron, the leaders of the right and left sections being one space in front of the second file from the right and left respectively of their sections. Sergeants are posted on the flanks of each section, the remaining sergeants being in the *serrefile* rank, one pace in rear of the rear rank. The sergeant-major is the squadron *serrefile*, and his position is three paces in rear of the centre of the *serrefile* rank.

Officers are never placed in the *serrefile* rank, but are invariably in front of a section.

One trumpeter rides with the squadron leader, the others in the *serrefile* rank.

The four best mounted and most intelligent men in each section are chosen as flankers (*nayezdniki*). Their duties are to deal with single hostile horsemen in front of the squadron, to observe and annoy the enemy, and to reconnoitre objects which might conceal an enemy. When sent out they are placed under a selected officer per squadron, with a trumpeter.

Six scouts (*dozory*) are also selected in each squadron, whose duties are to reconnoitre the ground to be traversed by the squadron and report obstacles. They may be sergeants or privates, and they ride 200 to 300 paces from the squadron, in front and on both flanks.

The principal formations of a squadron are line, columns of sections at wheeling distances, and echelon for gaining ground to the front and to a flank by a quarter-wheel of sections to that flank. A squadron can move to the front or to a flank in single file, in twos, threes, and sixes.

The Cavalry Regiment.—As a rule, a cavalry regiment consists of six squadrons told off from right to left. In line, intervals equal to the front of a section are left between squadrons, so that the front of a Russian cavalry regiment in line would be 6 × 86 + 5 × 19 = 611 paces.

A regiment generally works in line of squadron columns at deploying interval, but the interval may be reduced to 7 paces between the squadron columns for reserve formations. The column formations are columns of squadrons at wheeling distance, quarter column with 7 paces distance between squadrons, and columns of sections at wheeling distance.

Cavalry attack formation.—The general principles laid down are that cavalry are never to attack without a reserve, which is to follow up a successful charge, or cover the retreat if it results in failure. Great stress is laid on the importance of cavalry reforming rapidly after a charge, and a force which has overthrown the enemy by a successful charge is not allowed to take part in the pursuit till it has been re-formed.

The cavalry charge is always made in line, scouts being sent out in advance to reconnoitre the ground.

Wheelings, deployments, and formations of column are always made at a trot, unless otherwise ordered, and in retiring, the pace is in no case to be faster than a trot.

When acting against cavalry it is laid down that the front of the attacking force should be at least equal to that of the enemy. In advancing, the attacking force is to trot up to within about 600 or 800 paces, then gallop for about 400 or 500 paces, and charge when within about 200 paces of the enemy. If, however, the enemy is within 300 or 400 paces when the movement begins, the charge is commenced at once.

When acting against infantry a rapid pace must be maintained throughout, in order to reduce the casualties from the infantry fire, and the gallop is commenced at a distance of 1,000 paces from the enemy.

Large bodies of cavalry generally attack in direct echelon of squadrons, the reserve being kept in column. A not uncommon formation is the double echelon of squadrons from the centre, when the attack is made by the two centre squadrons, and the flank squadrons in column of sections form the reserve on either flank, 200 or 300 yards in rear.

It is considered that even unbroken infantry may be overthrown by cavalry if taken unawares, especially in flank, but if the charge is unsuccessful it is laid down that it is not to be repeated more than three times on account of the increasing confidence of the infantry and the ground being encumbered by fallen men and horses.

If an attack is to made on artillery, a moment is to be selected when the battery is in motion, or when limbering up or unlimbering. Even if in action a battery may be attacked in flank with impunity, but the attacking force should be in extended order. Guns, if captured, are either to be carried off or employed against the enemy, fifteen men in each cavalry regiment being instructed in gun drill for this purpose. If nothing else can be done the breech piece is to be removed.

Extended order is also to be used when attacking skirmishers or scattered parties of cavalry or infantry.

Brigade and Divisional Formations.—A cavalry brigade is composed of two regiments, a division of two brigades and two batteries of horse artillery. The reserve formation of a cavalry division is in two lines of regiments in squadron columns at close interval, with 40 paces interval between regiments and 40 paces distance between lines, the 1st brigade forming the 1st, and the 2nd brigade the 2nd line, with the two horse batteries in line 40 paces in rear of the 2nd line.

The usual attack formation of a division is in three lines, two regiments forming the 1st, one the 2nd, and one the 3rd line. No supporting squadrons are detached from the 2nd line to the 1st, as in the German service, but otherwise the tactical handling of the cavalry of both armies is much the same, having regard to the different composition of the divisions.

Dismounted Service.—For dismounted duty, the Nos. 1 and 3 in each rank dismount, No. 2 remaining mounted and holding the horses of Nos 1 and 3. Flankers are never employed as horse-holders. On dismounting, the men of a squadron form up in column of half squadrons, the 1st half squadron being formed by the 1st and 2nd, the 2nd by the 3rd and the 4th sections. Bayonets are at once fixed. If possible, in a squadron working independently, one section is always retained mounted. One sergeant per section, and one officer for every two or three sections dismounts. If more than two sections dismount, the squadron commander does so also. Every dismounted officer has a trumpeter with him.

The only formations are half squadron column, line, and dispersed order. In the latter, 1 to 3 sections are extended, and one remains in reserve per squadron ; the front of the skirmishing line is not to exceed 100 to 120 paces per squadron. The general procedure is as in a company of infantry and the drill is much the same. The horse-holders at once take the horses out of reach of the enemy's fire, and when the order to mount is given they hurry with them towards the dismounted men.

The general principal laid down is that the saddle is the proper place for a cavalry soldier, and that he is only to fight on foot when no infantry is available and where mounted action is impossible, such as in the defence of a post, or the capture of a wood, village or building. It is recommended to dismount as near the enemy as possible, but at not less than 1500 paces from him in open ground. Up to 800 paces from him the dismounted men should go forward as quickly as possible, without halting or firing, and then the advance by rushes of alternate sections begins. The mounted reserve should operate against the flanks and rear of the enemy.

Programme of Yearly Instruction of Cavalry.—*a.*—Period preceding the arrival of the recruits. (1st October to 1st December.)

(1) Examination of the men destined for the regimental instructional detachments.
(2) Formation and instruction of these detachments.
(3) Preparation and inspection of instructors for the recruits.
(4) Individual instruction of the men, dismounted service, riding, gymnastics, fencing, sword drill, scouting, vaulting, taking arms to pieces, preparatory musketry exercises. Special attention is to be paid to those men of the previous year's contingent who from illness or late arrival have not been put through the full course of instruction.
(5) School instruction in reading and writing.
(6) Theoretical instruction in military duties.
(7) Instruction in saddlery, fitting pack-saddles, packing, and bitting.

(8) Breaking in of young horses.
(9) Completion of instruction of sergeants.
(10) Officers' riding.
(11) Officers' tactical exercises.

b. Period from the arrival of the recruits to the beginning of the summer drills. (1st December to 1st May.)

(1) Instruction of recruits.
(2) Individual instruction of old soldiers as above. In March, target practice begins, and by the 1st May recruits and old soldiers should have finished not less than six of the practices of their course of preparatory and instructional firing. In March or April, according to climatic conditions, mounted drill in the open air begins, and raids and reconnaissances are begun.
(3) School instruction.
(4) Theoretical instruction.
(5) Instruction in instructional detachments, which are examined and broken up in April.
(6) Breaking in of young horses.
(7) Completion of instruction of sergeants.
(8) Officers' riding.
(9) Officers' tactical exercises.

In this period the men and remounts from the depôt squadrons are received, horses are cast, and men are selected for trumpeters, dresser, veterinary, and shoeing-smith pupils, and for artificers.

c. Summer drill period from 1st May to the beginning of the brigade drills. (9 weeks.)

The summer drills are performed usually in the large standing camps, and consist of 4 weeks' squadron drill and 5 weeks' regimental drill. The following distribution of drills is recommended.

	Squadron Drill Period.	Regimental Drill Period.
	4 weeks.	5 weeks.
1. Drill.		
a. Dismounting for fighting	2	2
b. Mounted drill, with or without a tactical idea	12	7
c. Exercises in dismounted fighting with or without a tactical idea	4	4
d. Dismounted exercise without horses	1	1
2. Outposts and patrolling.		
a. Dismounted	2	...
b. Mounted	2	4
	of which one by night each 12 hours at least.	one of 24 hours the others of 18 hours each.

3. Field service screening & reconnoitring ...	...	4 one by night.
4. Entraining in railway trains ...	1	... ...
5. Target practice	8	... 6
6. Judging distances	4	... ...
TOTAL	36	28

If for any reason the above programme cannot be carried out, the mounted drills are not to be reduced in number. In the regimental drills period, some of the field service exercises and outpost and patrolling exercises are carried out in conjunction with manœuvres of small forces, such as squadron against squadron, or half a regiment against the other half.

Other Branches of Instruction.—Great pains are taken in Russia to develop the staying power of men and horses. All through the winter route marches are made, and in the spring patrols and reconnaissances, sometimes to great distances, are sent out.

The concentrations for the summer camps of exercise are also utilised for practising strategic screening duties. Thus in the concentration of the 7th and 8th Cavalry Divisions for manœuvres in 1882, many detachments marched 40 to 65 miles a day for several days in succession, and one Cossack detachment traversed more than 80 miles in 54 hours, without any bad results to the horses. In the winter of 1883-84, two *sotnias* of the 1st Don Cossack Division received sudden orders to make a forced march from Zamost, cross the Vistula, and march on Tchenstokhov. The total distance was 230 miles and the orders (received on the 10th January) were that they were to be at Tchenstokhov by the morning of the 14th. The weather is described as *frightful* and the roads *bottomless*.

It was impossible to cross the Vistula on the ice, which was too weak to bear, so that the orders were changed to a march on Warsaw, and three squadrons of cavalry of the Guard and one *sotnia* of Cossacks were sent out from Warsaw, to oppose them. The Cossacks marched along the left bank of the Vistula, crossed the Viepr near Ivangorod by a ferry, which, could only take 14 horses at a time, surprised the cavalry sent out from Warsaw at 3 A. M. on the 14th January, and entered Warsaw a few hours later, having marched 220 miles in 72 hours, the last 85 miles being performed in one march and partly at night. The sections of each *sotnia* were only 9 files strong, and arrived at Warsaw with 6 or 7 files, each *sotnia* having left 16 to 20 horses behind.

To multiply such instances as the above would be interesting, but the two given will serve to show the tendency of the training of the Russian cavalry to undertake raids and carry on partisan warfare. The incidents of the American war, the raids of Stuart, Grierson, Morgan, and the early deeds of their own Cossacks have all had a great influence on the minds of the leaders of the Russian cavalry, hence the recent transformation of their Hussars and Lancers into Dragoons, and the adoption of an unit of cavalry equally able to fight on foot and on horseback. Whether the tendency to fight on foot, which was perhaps a little too strongly marked in the war of 1877-78, may not have been encouraged at the expense of the "Reitergeist" (an untranslatable word) remains an open question. German and Austrian cavalry writers answer in the affirmative, Russians energetically defend their new ideas.

Rightly or wrongly, however, the Russians have set about organizing and instructing their cavalry in an energetic and practical manner. Every year an officer and a detachment of men are sent from every cavalry regiment to the camp of instruction of a sapper brigade, to be trained as pioneers for two months.

Six pair of bladders, for swimming rivers, are carried per squadron. This is a branch of instruction in which the Russian cavalry are constantly practised. Thus, on the 3rd September 1883, the whole 4th Cavalry Division swam across the river Suprasl, a tributary of the Narev, a stream 104 to 130 ft. broad, 10 ft. deep, and with a current of 88 ft. a minute. The saddlery and kits were taken over in boats, and the men rode the horses bareback into the water and then swam beside them. The whole of the Cossack regiment was across in 27 minutes.

Cavalrymen are also trained in the use of the heliograph and telegraph.

To ascertain the preparedness of the cavalry for service, inspections are often held unexpectedly. Thus on the 28th October, 1885, orders were sent by telegram for the concentration of the 10th Dragoons at Bielostok, which orders only reached the squadrons at 12 midnight, 2 A.M., and 6 A. M. on the 29th. Of this regiment, 1 squadron was at Bielostok, 1 at Narev (10 miles distant.) 3 squadrons about Kniushin on the Brest-Graievo Railway (18 to 22 miles distant), and 1 squadron at Graievo (51⅓ miles distant). A special object (reconnaissance) was given to each squadron for its march. The squadrons left between 8 and 9 A. M, and reached Bieloslok between 4 and 9 P. M., and were inspected by the commander of the division on arrival. Fifteen reconnaissance reports were handed in by officers. On the 30th October, at 11 A M. regimental drill, with a tactical idea, was carried on for 2½ hours. The results of the whole were considered extremely satisfactory.

In this paper, which does not profess to be anything more than a compilation from sources within the reach of every one, all criticisms have been omitted. The subject is one that is worth the attention of cavalry soldiers.

To complete the article it would be necessary to give details concerning the recruiting, transport, and mobilization of the service, but these matters are so closely bound up with larger questions which affect the whole of the army that to attempt their discussion in this paper would be to lengthen the subject beyond all measure.

Many of the details given are of a somewhat dry nature, but no military organization can be described except by the careful analysis of those details upon which the greater questions depend.

NIGHT MANŒUVRES BEFORE KERTCH.

By Lieut. A. T. H. Newnham, *10th Bombay Light Infantry.*

In view of the attention which night manœuvres have lately begun to attract in foreign armies, the following account of some operations before Kertch may prove of interest to the readers of this Journal.

This account originally appeared in the *Russki Invalid.*

Two detachments are supposed to have received orders to move from Sebastopol to Kertch in order to attack that place, the first moving overland by Simferopol and Karasu-Bazar, and the second embarking at Sebastopol and carrying out its disembarcation on arrival at Kertch under cover of the first detachment. The detachment to be embarked consisted of 12 companies, eight guns and half a squadron of the Crimea Division, with a total of 186 horses.

On the 14th of August at 9 A. M. the embarcation began, and the loading of the baggage on the barges of the *Russia* and *Yaroslavl* belonging to the Volunteer Fleet was commenced. The time occupied in embarking the cavalry horses of the Crimea Division was on an average two minutes seven seconds a horse, and for those of the artillery one minute five seconds.

This great difference in the time required is attributable to several causes; firstly the cavalry horses are of a breed from the Black Sea, and are more excitable than the battery horses, often not permitting themselves to be secured and struggling violently when lifted by the crane; secondly the battery horses were the last to be put on board, consequently the men had acquired more practice; thirdly and chiefly the artillerymen had more service, and were experienced in embarking horses.

The embarcation of the horses was carried out in the following manner. The horse was seized under the belly by a specially constructed girth attached by a chain to the crane, and to prevent the horse striking itself against the sides of the vessel it was held in position by two ropes; the crane was then turned by steam until the horse was brought over the hatchway, when the chain was lowered and the horse received by men waiting below.

This is however a primitive method. In the first place a timid horse does not allow itself to be attached; the operation occupies time; frequently the horse is for a considerable time suspended in the air; and lastly as the end of the crane does not quite reach the hatchway, it is necessary to pull the horse towards it by means of the rope. It should be possible to improve the machinery for carrying out this operation, or better still get some specialist to work out a more convenient apparatus.

The necessity of economizing space on board rendered it indispensable to prepare beforehand some scheme of stowing away the various descriptions of material taken on board. To carry this out the gun carriages should be of a uniform pattern and the carriages of irregular siege trains strictly tabooed, since they would be exceedingly difficult to unload, supposing even it had been found possible to pass them down the hatchway into the hold.

Horses must be given as much room as practicable, especially on long voyages.

Towards 6 P. M. the embarcation of the horses was finished, and the men were then embarked on barges provided with sweeps, and while doing this several manœuvres were executed.

About 10 P. M. the vessels reached the open sea, the weather being fine though a little rainy. In consequence of the confined space where the men were, the temperature rose from 25° to 30° Reaumur; the atmosphere being so close during the voyage that even without the movement of the vessel it was sufficient to bring on sea-sickness. Generally speaking in order to avoid the inconveniences resulting from uncleanliness, care should be taken to give the troops an opportunity of seeing the way in which sailors manage on board ship.

On the evening of the 15th August the ships arrived at Theodosia and some preparatory manœuvres were gone through. The boats were lowered, the men took their places and cast off. Certain movements of change of front and formation into column were then executed in obedience to signals from the ships, but in spite of energetic efforts on the part of the officers these manœuvres were not attended by that amount of precision, which is to be desired.

From this it may be learnt that before launching the boats it would have been better to have issued more explicit instructions.

After leaving Theodosia the *Russia* lost sight of the *Yaroslavl* during the night and only succeeded in joining her again about mid-day on the 16th when off Kertch.

After a reconnaissance of the coast had been made, it was decided to postpone the disembarcation till the morning of the 17th, because if commenced at 1 o'clock in the afternoon, it would not have been finished before evening. For the night then the ships withdrew to the Caucasian coast.

Early on the 17th they disembarked without fighting, the division which had already arrived at Kertch being supposed to cover the operation: the ships drew as close to the shore as the depth of water would permit, lowered their boats and the disembarcation was commenced in comparatively calm weather. The infantry were disembarked first, and marched to Kertch so as to cover the landing.

A series of experiments were then carried out in abating the force of the waves by means of oil, first by projecting the oil from the shore by means of rockets, and secondly firing it from guns. In the former instance the oil was enclosed in a covering, calculated to break without difficulty (as for example egg shells) and fastened to small rockets which were projected from the shore. In the latter instance the soldiers rowed towards a given point and fired several rounds with the oil poured directly into the guns. A single egg-shell full of oil exercised an influence over a space more than 20 *metres* in diameter. The experiments however were not accompanied by sufficiently elaborate reports and the question still demands further investigation.

The disembarcation was finished by evening. The troops joined the detachment already stationed under the walls of Kertch and the commandant fixed the assault for the night of the 17th. One party was told off to make a demonstration, a second to make the real attack, and a third, as a reserve received orders to direct its movements with reference to the detachment making the real attack. The telling off of this general reserve was subjected to much criticism, but its appears fully justifiable, for this was not really a question of a sudden attack, but of an engagement consisting of a period of preparation for the attack, and the attack itself. In such a case it is necessary to so make the dispositions as to be ready for any of the eventualities which may occur during this time of preparation, comprising it may be a whole series of demonstrations.

The encounters between the advanced posts of the two hostile parties took place at about one o'clock in the morning, aud the attack of the outer works commenced at two o'clock ; these the assailing force took without any difficulty.

In obedience to the signals of the Commandant of the 7th Corps, who was fulfilling the functions of chief umpire, the defending force abandoned the works, and the assailants to carry out the instruction still further, descended into the ditch and escaladed the ramparts with cries of "Hurrah." At day-break they arrived before the citadel itself, the artillery of which opened a hot fire upon them, but at the moment when the attacking force was about to put forth fresh efforts to render itself master of this, the last refuge of the defenders, the order was given for the movement to cease.

SUMMER TRAINING OF THE RUSSIAN INFANTRY.

From the Russian.

By Lieut. A. T. H. Newnham, *10th Bombay Light Infantry.*

The following is a summary of an article, which appeared in the pages of the *Voyenni Sbornik*, or Russian Military Magazine.

The author commences by re-calling the fact that the parades and instruction of the Russian army up to the period of the Turkish war were entirely of a showy character, but that the experiences gained in that war convinced the Russians that, as troops exist for purposes of war, they should be trained entirely with that object in view. After the Turkish war the whole system of training in the Russian army underwent a change and the author proceeds to point out that although the general tendency of the new system is of a practical nature, there still remain certain points, which in his opinion require altering. We will now quote his own words :—

I will commence with musketry, as being the foundation stone of the art of war.

This as I remarked before was always on a good footing, moreover the regulations for it were well worked out, and frequently improved upon. The regulations to all intents and purposes are practical, but in my opinion the question of inspections is not as it should be.

Too great an importance is attached to these inspections, as is evident from the fact that the authorities have begun to publish in detail in general orders the results of musketry inspections and the defects that have been found by inspecting officers. The inspecting officers themselves have begun to judge of the efficiency of the whole by the satisfactory condition or otherwise of the part.

Musketry has aroused a sudden enthusiasm and has thus at one bound lost its significance as a means of preparation for war, and become merely a method for giving one regiment distinction over another, in other words officers no longer exercise themselves about its benefit as a training for war, but about obtaining a high percentage of hits at the inspection. In actual warfare troops manœuvre and fire simultaneously—in positions strange to them, at distances which have not been measured, in all sorts of weather, and at all times. Meanwhile all our military training consists of is to fire perpetually on the everlasting range, with the knowledge that the inspection will take place there, and that too under all favourable conditions, (for the first period this is as it should be) : moreover the firing is carried out to the prejudice of other duties. Every one knows that the musketry course is made half as long again, by repeating portions of the practice, especially at 300 and 700 yards, although this is expressly prohibited in the Musketry Regulations. Where is the time for this obtained from ? Of course at the expense of those very drills which are laid down in the syllabus. It sometimes happens even that the commanding officer permits no drills, except aiming, position and firing to be carried on before the inspection, and only upon the departure of the inspecting officer are the remaining drills commenced. They are then hurried through anyhow, while guard duties, picquets, and field exercises are omitted altogether: thus tactical instruction is by preference the very one to be curtailed.

A commanding officer has to have a great deal of character to prevent such a state of things. On all sides he is told that the musketry will be ruined, and this same falling off in the shooting is a serious matter and deeply wounds the vanity not only of a commandant, but of the whole regiment. The latter feeling has its good side too, so that there is all the more reason to regret that the thing is carried out on wrong lines, while it would be so easy to put it on the right tack. I said before that it all depends on the inspections. I take it that all these irregularities would in a short time disappear if a different style of inspection were instituted, of which the following conditions should form the basis. 1.—That the inspection should under no pretence whatever be carried out on the range. 2.—That it should consist of two parts: *a.* individual firing as practised at present, but with half the number of rounds; *b.* tactical instruction with ball cartridge. 3.—That the inspecting officer should inspect not only the firing, but the tactical evolutions and give them their due value.

For the first, the inspecting officer should carry out his inspection not when the regiment is brought together for its annual course of summer drills, but when the divisional camp of exercise takes place. In this way the locality would not be so well known to the troops, and the plan would also have the advantage of being more economical, since the number of places to be visited by the inspecting officer would be diminished almost by a third. Besides this the inspection itself not being carried out immediately upon the completion of the course would cease to be regarded in the light of a lesson, which had to be repeated and then put aside. Troops should always be able to fire well, and not only when the impressions left by a course just completed remain fresh. It goes without saying that under such conditions percentages should be entirely abolished as a means of judging merit.

As regards the second heading, the inspection of individual firing should be carried out as at present, omitting volley firing. For the individual firing sections might be called out instead of half companies, as being quite sufficient to give an idea of the efficiency which each company has attained in musketry training. In addition to this the composition of the section if selected by the inspecting officer will be of a more practical nature as in every section, there will be good shots and indifferent shots. Next it will be necessary to form out of the regiment a battalion on a war-footing, for which the inspecting officer himself will pick out the officers and men, but in no case should there be more than two company officers to each company, since in war there would never be more than this number.

The inspecting officer then gives out the general idea for the attack, and the targets being exposed accordingly, the practice begins, during the progress of which the inspecting officer or the commandant of the regiment* only interfere, when the officer commanding the troops or any part of the troops transgress their proper limits. Volley firing will be inspected during the movement, and not at the time of individual firing. The rounds for this will come out of the difference obtained by taking out sections instead of half companies during inspection of individual firing.

As regards the third, every inspecting officer without doubt is competent to judge of the tactical training, and to do this he should carefully note whether the movements are conducted in accordance with sound principles, whether the formations are regular and whether an ability to utilize the advantages of the ground is displayed, and in general so draw up his report on the tactical and musketry training of the regiment as to give no undue prominence to one over the other. In this way musketry will lose its one-sided character and go hand in hand with tactics, the general result being the much sought after preparation for actual warfare.

The consequence of all this on the musketry training will be to give it a more practical character. In my opinion it should be divided into two parts or periods.

The first of which in winter and spring will be strictly according to the letter of the regulations, all musketry of a show nature being omitted, to save time and avoid needless expenditure of ammunition. To effect this only one distance will be taken, from 400—600 yards inclusive, so that one regiment will fire at 400, another at 500, and so on, but so arranged that no regiment shall fire at the same distance two consecutive years. The volley firing should be removed into the second period.

In this latter period will be individual firing and afterwards field firing, which will be carried out by the two battalions in turn, every officer and man being present.

As regards the "Instructions for Field Firing in connection with Manœuvres, the three arms being employed," I see a great step forward in the right direction, and I would only observe that it would be desirable to give equal weight to the importance of the tactical and musketry elements, or even the supremacy of the former over the latter. Tactics decide the question of success in war, whilst musketry is only a means to that end.

I think moreover that the question of the duration of time, for which firing should be kept up on the targets, or dummies, should be left entirely in the hands of the officer commanding the movement, without hampering him with a strict adherence to the regulations, otherwise it may happen that one portion of the troops may have finished their rounds and remain inactive, whilst another is continuing to fire, which of course would never occur in actual warfare.

I will now pass on to the other points, also important, but comparatively less so, namely drill and tactical formations. As all know the former precedes the latter, and forms an indispensable stepping stone to it. In this department we have a whole library of books containing instructions and information of all kinds, but none the less it is impossible to pass it by without mentioning the excessive length of words of command used in carrying out an attack, and pointing out the enormous gap between tactical formations and manœuvres between opposing forces. I will enter a little more into detail concerning this gap, since it deserves a fuller attention. To all appearances our present system of formation approaches that of Frederick *i. e.* line formation, with this difference that instead of a locked formation it is open ; in spirit however we continue to uphold the perpendicular formation of Napoleon, as we preserve touch from front to rear.

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* A Russian regiment is composed of two battalions.

The characteristics of modern warfare are the difficulty of directing large masses and the increased importance of the part played by junior officers. All this it is necessary to bear in mind in carrying out instructions in manœuvring.

Our soldiers are possessed of boundless courage, and our officers embued with a lofty spirit of self-denial, in which respect they excel those of all other armies. It is this fact alone which has more than once extricated us from a position, where any other nation would have come to grief. But this is not all that is wanted. The ability to make a rapid decision and one which meets the demands of the occasion, the gift of never under any circumstances getting into confusion, there are also invaluable qualities. How are they to be attained? In war men do what they know : they know what they have learnt. Meanwhile our training is carried on in the most routine manner although it must be confessed great progress has been made in this respect compared with what used to exist before the Turkish war.

In our attack drills everything is carried out according to a cut and dried plan, every company in correct order without any commingling of various detachments. This state of things would be very desirable in war, but unfortunately it often happens that something quite the reverse takes place, and troops accustomed to act only in conformity with a well known plan unavoidably lose their heads, as soon as they are confronted with disorder. It is only after some experience, and dearly bought experience, that they learn how to extricate themselves with credit. Let us look now how an attacking force advances into action. First it gets into fighting order from the line of march, outside the zone of fire : arriving within it, losses in the ranks immediately commence, at first slight, but increasing in proportion as the enemy are neared, and reaching thier climax during the advance for the final attack. The reserves, which are behind come up in succession, and get gradually absorbed into the fighting line, and unavoidably mixed up with it. The officers should quickly divide the commands amongst themselves, although very often under their command they may find not only different companies of their regiment, but parts of different regiments. The subordinate officers should be taught to quickly restore order, especially after the attack is finished, and to form up the men without delay under the command of the nearest officer, without re-arranging them into their respective companies, and order them to take their commands from that officer.

Now how can all this be taught in peace time? Very simply. It is necessary only to practise losses on every attack parade, in proportion to the strength of the position occupied by the enemy. This can be done by declaring certain men as out of action, at first in small numbers, afterwards in greater, in proportion as the distance from the enemy decreases, and most of all during the final attack, at the same time paying strict attention that the men rapidly close up. Under these circumstances reinforcements can be carried out without fear of creating a solid locked line, and also a certain amount of mixing up involuntarily takes place. With all this one must not forget that a detachment which has been told off to effect a certain object, must not be taken out of action until it shall have performed that object, and only in the event of utter exhaustion or the clear impossibility of effecting its end should it be transferred to the reserve.

The above mentioned practice of imaginary losses is useful for the following reasons (i).—It accustoms the soldier to the idea that losses are inseparable from fighting, so that when he meets them in reality he will be less affected by them, although this feeling can never be entirely got over. Only those who have been in action know how the sight of the first killed and wounded acts on the nerves. (ii).—It is good practice for the medical officers and hospital assistants.

These imaginary losses too must be carried out in the case of officers, with the exception of the officer commanding the detachment and the officer superintending the manœuvres. In this way junior officers will learn quickly to take the place of their seniors and fulfil their duties.

Regarding tactical instructions and manœuvres I would add that it is absolutely necessary to take care that the scouts conscientiously carry out their duties. In the majority of instances the work is performed quite mechanically. There would be no harm in the general officers deputing their staff officers to find out whether the scouts had a proper knowledge of their duties. Further I would suggest that in manœuvres carried out by small bodies of troops it would be a good thing to practise the attack and defence of certain features of ground, especially fortresses, according to the method laid down in Dragomireffs' work.

Guard, and outpost practices are generally speaking established on a sound basis, but since no inspections take place in this most important branch of modern warfare, it stands a very good chance of being ruined, thanks to the innate carelessness of the Russian character. For this reason some sort of supervision is absolutely necessary, and this is easily insured. For instance the general commanding a division might send his senior staff officer on the night appointed for picquet duties to inspect the manner in which they are carried out, but he should in no case interfere. Every man employed on outpost duty should be able to give the desired information to all questions which are put to him by the staff officer, and the latter will then report all he has seen to the general commanding the division, and he, should circumstances require it, will demand personal explanations from the officer commanding the regiment. For regiments which are stationed where there is not a divisional staff, some such supervision is absolutely necessary.

In spite of the present fad for engineering, we have not yet reached the stage of being entirely carried away by it, and consequently the matter is treated with common sense. The chief point is entrenching with the small spade, and especially under the enemy's fire. As far as I have observed this important matter is everywhere more or less well managed. The "Instructions" for it are excellently drawn up and the explanations clear and simple. The "Regulations for Instruction of Sapper Companies in the Infantry" are a little more intricate.

In my opinion the seconding of officers and subordinate ranks in sapper brigades is most useful, but the number of the latter should be reduced by half, so that fewer man should be taken away from their proper duties. The instruction of the subordinate ranks, however, in such an extensive programme as is laid down in the above mentioned Regulations I cannot but think is both difficult and useless. Difficult because the time allowed is not sufficient, and useless because the officers even when they have gone through their course can never replace engineer officers pure and simple, and secondly because whenever any important fortifications or lines of communication have to be constructed an engineer officer with a company of sappers is always applied for. Besides which it is hard to ask an infantry soldier to carry out a purely engineering work. Moreover during the course he forgets his own duties, and does not thoroughly acquire the new. For this reason I take it the "Regulations for Instruction of Sapper Companies in the Infantry" should be considerably simplified throughout all its parts, and more especially as regards fortifications and lines of communication.

It would be desirable to practise drill as often as possible with companies of war strength and also carry out manœuvres with opposing forces in the same way, although there is no provision for the latter in the syllabus of annual training. In this way the eye would get accustomed to judge distances accurately for taking up positions, etc, which with the present companies of half strength or even less cannot be practised.

Manœuvres on a large scale are carried out in a sensible manner: the commanders of opposing forces are granted full liberty of action, the troops are quartered for the night with a due regard to the progress of the manœuvres, and due attention has been paid to the working of the transport, our weak point. And yet much remains to be done as to preserving mutual relations between the various arms and the support which they should infallibly give each other.

These manœuvres unfortunately are very expensive and so cannot be carried out as often as one could wish. And yet it is a practice which is exceedingly useful for commanding officers and officers of the general staff, and also for developing enterprise amongst the cavalry, which thus has a wide field for operations thrown open to it.

During the last two or three years the authorities have begun to practise manœuvres in which fortresses play a part. The advantage of this is evident, but the plan is as yet new and not regularly established. Would that it were so..

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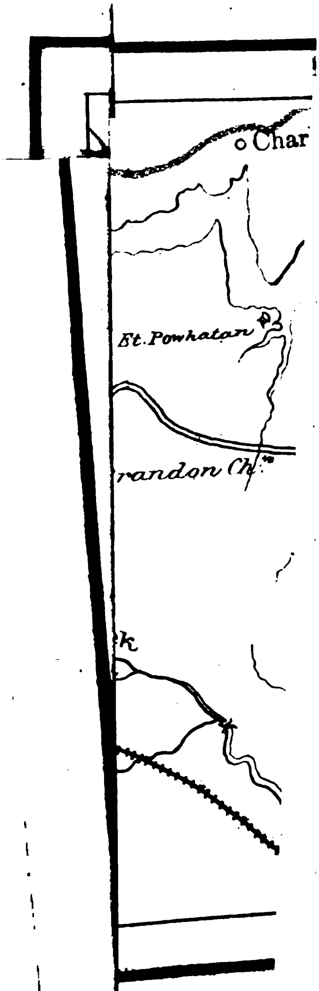

United Service Institution of India.

Extract from the Proceedings of the Half-yearly Meeting of the Council of the United Service Institution of India, held at Simla on the 28th June, 1889.

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PRIZE ESSAYS 1889.

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"THE ORGANIZATION OF EUROPEAN AND EURASIAN SUBJECTS IN INDIA (INCLUDING VOLUNTEERS) NOT BELONGING TO THE ARMY AND NAVY."

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1.—The candidates must be Government Gazetted Officers.

2.—The Essays must be legibly written, or printed, not exceeding 32 pages of the size and style of the Journal.

3.—Essays must be received by the Secretary on or before the 1st March 1889.

4.—The Essays must be strictly anonymous, but each to have a motto, and be accompanied by a sealed envelope with the motto written on the outside and the name of the candidate inside.

5.—The Essays will be submitted for decision to referees chosen by the Council.

6.—The name of the successful candidate will be made known at the Annual Meeting in May 1889, and his Essay will be printed in the Journal.

7.—All Essays submitted to become the property of the United Service Institution of India *absolutely*, and authors will not be at liberty to make any use whatsoever of the Essays without the sanction of the Council.

The report of the referees on the Prize Essays was read.

Resolved.—That in accordance with the decision of two out of the three referees the Gold Medal be awarded to the Essay with the motto.

"*Strangers in a Strange Land.*" (Captain B. Duff, 9th Bengal Infantry).

The Essay

"*Vicinus Urit Ucalegon*" (Captain A. H. Mason, R.E.)

was considered the second best, and it was decided that these two Essays should be printed in the Journal *in extenso*.

Essays were also received from

"*To the utmost of our power.*"

"*The blast of war blows in our ears.*

"*Stiffen the sinews.*"

"*Why then 'tis time to arm and give direction.*"

"*Quot homines tot sententiæ.*"

And it was decided that extracts from these should be published in the Journal.

The Council beg to acknowledge the valuable services rendered by the referees.

The Journal
OF THE
United Service Institution of India.

VOL. XVIII. 1889. No. LXXVII.

PRIZE ESSAY, GOLD MEDAL.

BY CAPT. B. DUFF, B. S. C.

"Strangers in a Strange Land."

Introductory.

IN discussing the subject allotted to this essay, I propose to reverse the order of the sub-heads given on the title page, and to commence by considering the organization required for local defence. That organization must be the broader and more comprehensive of the two, and must, in consequence, form the basis on which any proposal for the organization of the European and Eurasian civil population of India, as auxiliary to the British forces, must be built up.

Part I.

On the organization required for the local defence of life and property.

(a). The necessity for such an organization.

The conditions under which the English people hold and govern India are without precedent in the history of the world.

This, indeed, forms one of the main difficulties in the consideration of any proposed changes of system in that country, for the results to be expected from such changes must, to a very great extent, be matter of theory unilluminated by any light gained from the study of similar cases in the history of other nations.

The conditions of alien rule in general.

An alien government ruling over a people made up of a number of subject races must base its power on one or more of the three following conditions :—

(1). The good-will of those governed.

(2). Want of unity of feeling and interest between the various subject races.

(3). The support of such a military force, composed of men of the ruling race, as may suffice to render successful rebellion impossible.

Now it is evident that, of these three conditions, the first is not to be controlled with any degree of certainty even by the best intentioned government. So long as the ruling power considers what is likely to be eventually beneficial to the ruled, rather than what is immediately pleasing to them (and this must, necessarily, be the case with a government such as we are considering) its popularity must be subject to variations which may often be both violent and sudden.

The second condition is one which can only be maintained and strengthened by favouring some of the subject races at the expense of others—a policy of very doubtful advantage—and the mere fact of being subject to one and the same government, together with the weakening effect on narrow local prejudices of the spread of education and the improvements in the means of communication, tends to render the "Divide et Impera" principle of less and less value as time passes on.

The third condition, then, is the only one which can be looked on as a constant factor in the problem, and thus an adequate military force of men of its own nationality must be regarded as the indispensable and fundamental condition on which alone an alien government, such as we have been considering, can safely base its power.

These considerations applied to India.

In applying these conclusions to our Indian empire we find our rule based, in part, on each of the three foregoing conditions. By good laws and just government, by giving to life and property a previously unknown security, and by effecting vast improvements in the material prosperity of the country, we have (to a certain extent) conciliated the good will of the native races. More important for us are the differences of creed and race which render the task of governing India very different from what it would be were the population homogeneous in these respects. Still, even with these points in our favour, it must be acknowledged that the power and influence of the Government of India are in direct proportion to the number of British bayonets which it can place in the field.

Sir John Malcolm's opinion.

The words of General Sir John Malcolm written in 1832, are as true to-day as they were fifty-seven years ago. "The empire" he writes "has been acquired, and must be maintained, by the sword. It has no foundation—and is not capable of having any made—that can divest it of this character. We may, by good government, diminish the elements of sedition, and in a degree disarm the hostility of Asiatic Princes, but we can never expect active support in the hour of danger from the mass of the population of India. A passive allegiance is all these will ever give to their foreign masters; and even this allegiance, the more they become enlightened, and are imbued with the feelings our intercourse must impart, will become more uncertain. It is, therefore, to the army in India we must look for the means we possess, not only of maintaining our power, but of preserving the great benefits we have already conferred, or may hereafter confer, upon the millions subject to our authority. No consideration, therefore, should ever induce us to forget for one moment the paramount and vital importance of our military power."

That of Sir H. Lawrence.

Sir **Henry Lawrence**, whose opinion must always carry the utmost weight in any matter connected with India, wrote in 1845 that "at first sight bayonets and red coats do not appear to be precisely the instruments of government which a philanthropist would advocate, but we belie or deceive ourselves when we declare or fancy that our government (in India) is maintained otherwise than by the sword." In another part of the same essay he writes: "But it behoves us, under every view of the case, to keep up our strength. Debility, the result of apathy and negligence, would be nothing short of a state of crime: there are few national, as there are few bodily, ailments which have not their seat in debility, and any very apparent symptoms of weakness in the dominant power would, under the present circumstances, plunge the country into a state of terrible disorder, aud gird about with desolation every province of Hindostan."

And of Sir H. Durand.

Sir **Henry Durand** writing in 1860 puts forward the same fact with equal force and clearness. "The truth" he says "is seldom grasped, that we have struck no root, and are only on the surface of the Empire, the only certain and permanent source of power and influence being the military hold of the country."

The native population and army of India.

Such being the vital importance of the maintenance on a satisfactory footing of our military power in India, let us examine how we actually stand in that respect.

The native population of India may be stated in round numbers at 250,000,000, of whom about two hundred millions reside in British India and fifty millions in the various feudatory states. Of these we employ 127,000 thoroughly trained men in our native army, and forces aggregating 350,000 men more or less trained are maintained by the various native princes.

The present strength of British troops.

The number of British troops in the country, with which, as I have endeavoured to show, the peace of India and the stability of the Government are indissolubly bound up, amounted on the 1st October, 1887—the date of the last return to which I have had access—to 70,552 of all ranks.

Strength of the troops maintained in times past.

To decide whether this force is sufficient to uphold the Government and to preserve order it is necessary to refer to history to see what strength has been found sufficient in the past.

In 1794 the British troops numbered about 16,000 to 82,000 natives, or a ratio of 1 to 5.

In 1808 there were 24,500 British to 154,500 native troops, or a ratio of 1 to 6·3.

At the end of 1856, just before the mutiny, there were in India 39,375 European and 214,985 native troops, being a ratio of 1 to 5·4.

In 1878 the Indian armies consisted of 60,241 British and 135,000 natives troops, or 1 to 2·2.

The numbers at present are 70,552 to 126,573, or as 1 to 1·8.

Present strength sufficient during peace.

The force of Europeans in India, then, has of late years been greatly increased, not only in actual numbers, but also in proportion to the number of native troops maintained.

Other precautionary measures also, such as the retention of the artillery (except a few mountain batteries) in European hands, the guarding of the principal arsenals by European troops, and the great advance in the internal communications have so combined to increase the advantages on the European side in the event of a struggle that, so long as she is not weakened by conflict with external foes, the internal peace of India may be looked on as secure.

Denudation during war may be dangerous.

It is while engaged in a struggle beyond the frontier that danger is to be apprehended from the force of Europeans in the country dropping below the minimum necessary for security. Formerly it was not so, to anything like the same extent. So long as our only foes were Asiatics the proportion of British troops in any expeditionary force might be very small.

I cannot call to mind any Indian campaign up to the present time in which the European troops have constituted more than one-third of the whole force, and in former days the proportion was usually very much less. Yet even in 1835 Sir Charles Metcalfe wrote as follows : " If we recollect that when we (in India) want to send troops to meet external enemies, we need troops most at home, and when our force is carried out of our territories in time of war, it is most required within them, the argument which would lead us to disregard the necessity of being in a state to make rapid preparations to meet any emergency appears to me to be most fallacious. The fact is that under no organization of our army can the preparation of regular troops be rapid enough ; and it will always be a difficulty, when we enter into war, how to supply with sufficient celerity within our dominions any description of troops to be substituted for the preservation of order and tranquility in lieu of those that must, on the exigency, be sent away."

Reinforcements from England doubtful.

In all human probability our next great struggle will be against Russia. It seems likely that it will be considered necessary on our side to increase the proportion of European troops up to one-half of our total force in the field. In the event of a really serious struggle it is very doubtful if any additional British troops could be expected from England. On the contrary, it is almost certain that, should an Imperial necessity demand it, a portion of the British troops in India would be withdrawn for use elsewhere in the interest of the Empire as a whole, and India thrown on her own resources to replace them. As an example of what might occur, we find Colonel F. Maurice, R.A. (a writer exceptionally likely to be acquainted with the plans in favour at Army Head-Quarters in England) in his latest work, " The Balance of Power in Europe," apparently in favour of meeting a Russian attack by the despatch of a force to make a counter-attack on some point on the Russian line of communications, between Herat and the Caspian. Leaving on one side the advisability of such a movement, which seems at least to be open to argument, it seems quite possible that in that case India would be called upon to send troops to take part in such an expedition, whilst at the same time engaged in an active defence beyond the frontier.

Force of British troops might fall very low.

It is impossible to forecast what number of British troops would then remain available for the maintenance of internal order in India, but it is abundantly clear that the number would be small, and that it would be absolutely necessary to hold them massed at the various strategic points of vital importance on the great lines of communication. Thus great tracts of country lying at a distance from such points and often containing a very considerable European and Eurasian civil population would be left entirely without British troops.

The great value of our native army.

Lest I should be misunderstood, I would pause here to insist as strongly as possible on my firm belief in the bravery and fidelity of our native troops, who, if properly officered, may be trusted to face in our interest any foe, European or otherwise, against whom they may be required to act, so long as we can maintain our *prestige*. Should, however, a Russiam army succeed in making good its footing upon Indian soil their belief in our power would be shaken and their fidelity sorely tried. History shows us no example of any great body of mercenary troops who have remained true to their allegiance beyond the point at which they ceased to believe in the ability of the power by which they were maintained to hold its own against all assailants.

Sources of danger.

Again, it must be borne in mind that, especially in the great towns, India swarms with restless spirits, increasing in numbers with the spread of education, who would welcome any change of government in the hope of snatching advantage to themselves from the state of anarchy certain to ensue. The armies of the native states, again, whose loyalty to the English power is by no means so well ascertained as that of our own native army, might become a very serious danger were the force of armed Europeans reduced below a certain point. The tendency to worship the rising sun, nowhere so potent as in India, must be fully taken into account, and the possibility must be considered that a defeat, even beyond our frontier, might be followed by the fulfilment of Skobeleff's anticipations of revolt on the part of some of the feudatory princes.

Exaggerated idea of Russia's power.

Lord DALHOUSIE, in his minute of 15th September, 1854, wrote "Although the war with Russia does not directly affect our Indian dominions, yet it is unquestionably exercising at this moment a most material influence upon the minds of the people over whom we rule, and upon the feelings of the nations by which we are surrounded; and thus it is tending indirectly to affect the strength and the stability of our power. The authorities in England cannot, I think, be aware of the exaggerated estimate of the power of Russia which has been formed by the people of India. I was myself unaware of it until the events of the past year have forced it upon my convictions."

Therefore organization is necessary.

Under such circumstances the adequate protection of the lives and property of the non-military European and Eurasian population of India might become a matter of the gravest difficulty, and it thus appears urgently necessary to consider whether it is not possible to introduce such an organization as would enable them to provide, in a great measure, for their own safety.

Necessity for laying the matter clearly before the Indian public.

I offer no apology for having written at such length, or for having put forward arguments, which have, time and again, been laid before the Indian public. That they have never taken any adequate steps to obtain for themselves such an organization is conclusive evidence that the necessity for it has not been understood, and that the danger to which they may be exposed has not been realized, and until these facts can be brought home to them no comprehensive scheme of local defence has the smallest chance of being accepted by the European and Eurasian civil population of India.

(b). What has already been done. The volunteer movement.

The Volunteer movement is the only step that has ever been taken in this direction. The organization, as it at present exists, is about 30 years old. The senior corps being the Nagpore Rifles raised in 1860. The movement owed its origin to the impression left by the events of 1857. Since that time it has been slowly but surely increasing in size and importance. Thus in 1882-83 the number of efficient volunteers was 9,422, whilst the last return shows that in 1887-8 these had increased to 13,098.

Number of railway and other volunteers.

I shall have occasion shortly to compare these figures with those showing the available European and Eurasian population, and for this purpose it should not be lost sight of that on all our lines of railway in India, volunteering is, in practice if not in theory, a condition of appointment. We find, accordingly, that in 1882-83 there were 3,014 efficient railway volunteers, and that in 1887-8 their number had increased to 4,431. Thus for the remainder of the population the numbers of efficients for those years were but 6,408 and 8,667, respectively, the increase however being at the satisfactory rate of 35 per cent. in the five years.

The figures must be compared with population.

That the force is gaining ground may then be admitted, but to estimate its numerical relation to the population from which it is recruited, we must turn to the report of the last census. We are fast approaching a new census period, and these figures are now old. They are, however, the latest available, and, as both the European and Eurasian populations are understood to be increasing, they may be safely taken as being less than the actual totals at the present day.

Statistics of the white population of India.

It is stated that, of those who profess the Christian religion throughout India, some 204,698 have European blood in their veins. This total is exclusive of the army and is made up as follows :—

British born	83,330
Eurasians	62,084
Other Europeans	59,284
Total	204,698

Of those returned as British born 70,720 were males and 12,610 females, whilst of the total 83,330 of this class no less than 72,382 were between 20 and 40 years of age. Thus, by proportion we arrive at 61,428 as the number of British born non-military males between the ages of 20 and 40.

As to the age and sex of the Eurasians I have no data, but perhaps 15,521 or one fourth of their total number may be assumed to be males between 20 and 40.

A difficulty arises in the case of " other Europeans" since I have no means of knowing how many of these are British subjects. These may, however, perhaps be assumed at 40,000, of whom the majority are of Portuguese descent, and 10,000 may be taken as the number of their males between the ages of 20 and 40.

Thus for the available male population between these ages we get :—

British born	61,428.
Eurasians	15,521.
Other Europeans	10,000.
Total	86,949.

These figures compared with the number of volunteers.

It appears then that, exclusive of railway men, considerably less than one-ninth of the available male population are efficient volunteers. Elsewhere than in India such a result would be eminently satisfactory but, in face of the conditions which obtain in that country at the present day, no organization can be pronounced a success which leaves over 70,000 available men of European descent without military training and without arms, not only unable to protect themselves but requiring that the State should devote to their protection a large portion of that force which, in the hour of danger, will be most urgently required for other duties. No doubt the growth of the volunteer movement on its present lines would in the course of years, gradually include a much larger number of those available than at present. The misfortune is that we cannot afford to wait, Who can say that the time necessary for such slow growth will be granted us? That is a factor in the problem over which we have, admittedly, no control.

Force might be increased on the appearance of danger.

There can be no doubt that, on the appearance of danger, the number of enrolled volunteers might be immensely increased in a very short time. Very many men in India will admit every argument in favour of volunteering, even acknowledging if pressed that it is the duty of every man to join the force, and yet put off doing so with that curious disinclination common to Englishmen—both as individuals and as a nation—to prepare themselves fully beforehand for the dangers of the future.

But it is doubtful if there would be time.

In India, however, the dangers against which the volunteer force is intended to guard give no long warning of their approach. When the Mutiny of 1857 burst upon the Government of India it found it absolutely unprepared. Then the value of organization was fully exemplified. Wherever due forethought had been exercised, there little bodies of Europeans were to be found holding their own against the heaviest odds, whilst on the other hand no time for preparation was granted to those who had previously neglected it.

All arrangements must be made in time of peace.

To be of value the men must be enrolled and trained in time of peace, and in so far as it has failed to attract the majority of the available men, so far it must be held that volunteering has failed to adequately fulfil its object and that some further and more comprehensive organization is required.

(c). The proposals which have been already put forward.

It is instructive to examine what measures have already been put forward by officers thoroughly acquainted with all the conditions of volunteering in India for the purpose of increasing the strength of the force.

Proposals for increasing the present volunteer force.

The most important of these are contained in the essays written in 1883 on the subject of "Volunteering in India" for the Gold Medal of the United Service Institution of India and in a paper published by Major **Gray** in the Journal of the same Institution in 1879. Commencing with those who advocate the smallest changes we find that Major C. A. **Dodd** makes the following suggestions for increasing the strength of the force, in addition to to certain others which deal with improvement in discipline and drill.

(1). Concessions and advantages to be granted to volunteers to induce them to join.

(2). Official influence to be used and pressure to be brought to bear to make men employed in Government service enroll themselves in the force.

Captain F. R. **Begbie**'s suggestions were very similar to the foregoing but he expanded the idea of using official influence into the proposal to make service in the volunteers a condition of obtaining employment under Government. He also suggested, in passing, the formation of a compulsory militia force, but on this part of the subject I shall have more to say hereafter.

Concessions to corps as a whole.

Now the question of concessions and advantages divides itself naturally into (*a*) measures which affect the corps as a corporate body, and (*b*) those which apply to the individual men. The first of these would include contributions towards the building or hiring of suitable head-quarters, the erection of the necessary ranges, assistance in support of a band when maintained, and many other such methods of saving corps from being called on to contribute in money as well as in person.

This class of inducement, although valuable in other ways, would have little effect on enlistment. The cost of volunteering falls almost entirely on the officers and not on the men, and whilst better men might thus be induced to accept commissions, the addition to the numerical strength of the force as a whole would probably not be great.

On the other hand the claim is often made for individual advantages, such as the exemption of volunteers from particular taxes, the grant of free passages to England, or of waste lands in India after a given length of service. These concessions and others like them would, no doubt, influence more men, especially among the poorer classes to join the force, but men so enrolled could scarcely be called volunteers except in the sense that they would be obtained by voluntary enlistment. It appears to be often overlooked that the man who serves to obtain exemption from a tax, a free passage home or any other private advantage, is paid for his service just as much as the man who receives the equivalent of the tax or fare in hard cash. Just as the earning of money by any form of athletics transforms the amateur into the professional with loss of all advantages which pertain to the *status* of an amateur, so the acceptance of payment (direct or indirect) over and above his necessary expenses, would transform the volunteer into the paid professional soldier of the State and he would find it difficult to show why he should not be made subject to military law.

Advantages to individuals.

It does not appear then that any inducement which would not cut at the root of volunteering would be successful in drawing into the ranks the majority of the available men.

Official influence, again, would affect only a small part of the community and, so long as the officials using that influence were not themselves zealous volunteers, the results would probably be small and transient.

Official influence.

Captain Collen, in his prize essay, completely disposes of the proposal to enforce volunteering as a condition of appointment to any post under Government. "Such a measure" he writes "would strike at the root of volunteering. Government does not pay for the services of its *employés* as soldiers and there is no reason why one particular portion of the community should be taxed in service for the benefit of the remainder. It is quite another thing to apply a general principle to the whole community without exception."

Volunteering as a condition of Government service.

On the other hand it has been argued that civil *employés* of the Government of India are more interested than any other class in the stability of that Government and should therefore be the first called on to take arms in its defence. However this may be, it is clear that such a measure would affect but a small part of the available population and would therefore be inadequate to the end in view.

Proposals involving compulsory service.

This brings us to a second class of proposals—those which are based on some form of compulsory service. The first of these with which I am acquainted is one by Lieutenant (now Colonel) Collen written in 1872 and again put forward in his prize essay in 1883. After showing the necessity for a strong force for local defence by a line of argument generally similar to that adopted in this essay, he sketched the outline of a system of compulsory militia service for India, to include all non-volunteers, the amount of drill required to be reduced to a minimum and to be carried out at the stations where the men reside.

In the paper, published in 1879, before referred to, Major Gray advocated the creation at the presidency towns and other great centres, of regular local regiments and garrison batteries of Eurasians. Secondly, the formation of a militia force to include all men, not belonging to the regular forces or the volunteers, between the ages of 18 and 36, with a reserve to include all between 36 and 48—the members of the active force being embodied for ten days annually at the military cantonment nearest to their respective homes and being organized in battalions of infantry and batteries of garrison artillery.

The principles underlying these proposals.

The principles underlying these two proposals are the same, namely :—

(1.) The recognition of the liability of every man to be called upon to submit to so much training as will fit him to take part in the preservation of order if required.

(2.) The creation of an organization in which there shall be a place for every man able to handle a rifle ; and

(3.) That every man should know his assigned place in that organization and be prepared to fill it promptly and without confusion should the necessity arise.

It seems clear that any successful scheme of local defence for India must be built up on these general lines.

The right of a Government to enforce compulsory service.

In the present day the right of a Government to demand personal military service for the defence of the State from every male member of that State will scarcely be seriously disputed.

The principle is enforced in every country on the continent of Europe and it has been recognized by the law of England for centuries. Although the feudal levy was abolished in England at the restoration in 1660, yet the liability to serve in the general levy has never been extinguished and still remains, not only in constitutional theory, but also in the statutory and practical form of liability to serve both in the general and local militia. By the law of England every man between 18 and 30 is liable to be ballotted for the general, or regular militia, and if drawn, to serve for five years or provide a substitute, and this liability is still in force, though since 1829 it has been suspended from year to year by an annual act.

The local militia was established in 1808 and the various acts relating to it were consolidated in 1812. These provide that every man drawn by lot shall serve for four years and no substitutes are allowed. The general provisions of the acts passed in that year are still in force though the local militia is at present in abeyance. Act 43, Geo. III c. 96 recites that it is expedient "to enable his Majesty more effectually to exercise his ancient and undoubted prerogative of requiring the military service of all his liege subjects in case of the invasion of the realm by a foreign enemy."

The proposal, then, that all men of European descent in India should be liable to personal service contains nothing new or unconstitutional. The proposed liability is precisely that obligation to render personal service, for defence only and not for offence, which already exists for every man in England.

Compulsory service, though legal, is not enforced in England.

It is true that at home special conditions have enabled successive Governments, whether wisely or not, to keep this power in abeyance but none of these conditions exist in India.

In comparing our English system of defence with that of continental powers it is necessary to keep in mind our insular position and also the fact that our wars are mostly colonial, and that during these the mother country incurs no risk of invasion, so that the mass of people are little interested in them and prefer to pay for an expensive army rather than serve themselves. Also nearly all continental nations have during the last hundred years, had actual experience of an invasion, which England has escaped, and the memory of these and the feeling that in almost every war they are fighting for their national existence are the motives which induce them to submit to universal service.

Conditions in India are very different.

Now it is evident that, owing to the advance of Russia, the military situation in India resembles that of one of the continental powers of Europe much more nearly than that of England, and, in the case of men of European descent, not only has every argument which can be urged in favour of universal liability in Europe its full force, but these are strengthened by others dependent on their situation in the midst of a population infinitely outnumbering them and separated from them by differences of race, colour and religion.

Doubt as to whether the obligation would be accepted.

Though it might be impossible to enforce this liability without the free consent of those whom it would affect, yet the arguments in favour of it are so strong and appeal so directly to the instincts of self interest and self preservation in each individual that it is difficult to believe that they would be unwilling to accept the burden could the reasons for it once be brought fully and fairly home to them.

Points to be kept in view.

This, however, is a question for the politician rather than the soldier. It is sufficient for the purposes of this essay if three points be kept in view in order to minimize the objections to the proposed innovation.

(1). That the sacrifice to be demanded from the community be the smallest, consonant with the object in view.

(2) That sweeping changes of system be as far as possible avoided.

(3). That the cost to the country be the lowest possible.

(d). The Writer's proposals.

Having then decided that any satisfactory organization must be based on universal service, it becomes necessary to consider the conditions under which such service should be rendered.

Commencement of liability.

The first point is the age at which liability should commence. In most European countries this is fixed at 20 years to permit of the men's education being, as far as possible, complete before they are called upon to join the ranks. This argument would not carry by any means the same weight in India, as the amount of training to be undergone need not in any way interfere with a young man's studies. Still, it is to be remembered, that those born in England rarely come out to India before the age of 20 and that, at an earlier age, the Eurasian seldom shows much physicial development. The liability may be assumed then to commence on the 1st of January of the year in which a man will complete his twentieth year.

Its duration.

The duration of liability should correspond with the average stay of the European in the country. To make it shorter than this would be to waste good material, whilst to make it longer would perhaps tend to discourage men from settling in India and would make the burden on the Eurasian heavier than on the ordinary European, which is by no means desirable. I have previously shown that the great bulk of the British born men are between 20 and 40 and the liability should, I think, exist between these ages. Since, however, events are always possible in India which would force every man, no matter what his age, to make up arms in self defence, men up to 50 years of age, should form a reserve to be used only at utmost need.

Who should be liable.

The persons liable to serve should be all those who, both by blood and religion, are so connected with the ruling race as to be directly interested in the maintenance of British rule and of the internal peace of the country. This would, I think, include all men with any mixture of white blood, however small, so long as they did not adopt any of the native religions, and the experience of the Mutiny seems to bear out this view.

The limitation in the matter of religion would be necessary, as a man of mixed race who belonged to any of the native religions would be likely to be more in sympathy with his native, than with his European kindred.

Exemptions.

Exemptions should be very few. I am at present only dealing with local defence of life and property, and therefore the physical standard should be so low as to embrace all those capable of carrying and using a rifle for a few hours at a time. The test for sight should be a very slight one and, in fact, the bodily disability which should be regarded as rendering a man physically unfit should be very grave indeed.

Besides those found medically unfit, the following would be exempted by the nature of their duties :—

1. All persons belonging to the army or navy.
2. All persons employed in the police.
3. Clergy of all denominations.

Force of British troops might fall very low

It is impossible to forecast what number of British troops would then remain available for the maintenance of internal order in India, but it is abundantly clear that the number would be small, and that it would be absolutely necessary to [illegible] massed at the various strategic points of vital importance [illegible] great lines of communication. Thus great tracts of country lying at a distance from such points and often containing a very considerable European and Eurasian civil population would be left entirely without British troops.

The great value of our native army.

Lest I should be misunderstood, I would pause here to [illegible] as strongly as possible on my [illegible] belief in the bravery and [illegible] of our native troops, who, if properly officered, may be [illegible] to face in our interest any foe, European or otherwise, [illegible] whom they may be required to act, so long as we can [illegible] *prestige*. Should, however, a Russian army succeed in [illegible] good its footing upon Indian soil their belief in our power [illegible] be shaken and their fidelity sorely tried. History [illegible] example of any great body of mercenary troops who have remained true to their allegiance beyond the point at which they ceased to believe in the ability of the power by which they were maintained to hold its own against all assailants.

Sources of danger.

Again, it must be borne in mind that, especially in the great towns, India swarms with restless spirits, increasing in numbers with the spread of education, who would welcome any change of government in the hope of snatching advantage to themselves from the state of anarchy certain to ensue. The armies of the native states, again, whose loyalty to the English power is by no means so well ascertained as that of our own native army, might become a very serious danger were the force of armed Europeans reduced below a certain point. The tendency to worship the rising sun, nowhere so potent as in India, must be fully taken into account, and the possibility must be [illegible] that a defeat, even beyond our frontier, might be followed by the fulfilment of Skobeleff's anticipations of revolt on the part of some of the feudatory princes.

Exaggerated idea of Russian power

Lord DALHOUSIE, in his minute of 15th September, [illegible] wrote "Although the war with Russia does not directly affect our Indian dominions, yet it is unquestionably exercising at this moment a most material influence upon the minds of the people over whom we rule, and upon the feelings of the nations by which we are surrounded; and thus it is tending indirectly to affect the strength and the stability of our power. The authorities in England cannot, I think, be aware of the exaggerated estimate of the power of Russia which has been formed by the people of India. I was myself unaware of it until the events of the past year have forced it upon my convictions."

Therefore organization is necessary.

Under such circumstances the adequate protection of the lives and property of the non-military European and Eurasian population of India might become a matter of the gravest difficulty, and it thus appears urgently necessary to consider whether it is not possible to introduce such an organization as would enable them to provide, in a great measure, for their own safety.

Necessity for laying the matter clearly before the Indian public.

I offer no apology for having written at such length, or for having put forward arguments, which have, time and again, been laid before the Indian public. That they have never taken any adequate steps to obtain for themselves such an organization is conclusive evidence that the necessity for it has not been understood, and that the danger to which they may be exposed has not been realized, and until these facts can be brought home to them no comprehensive scheme of local defence has the smallest chance of being accepted by the European and Eurasian civil population of India.

(b). What has already been done. The volunteer movement.

The Volunteer movement is the only step that has ever been taken in this direction. The organization, as it at present exists, is about 30 years old. The senior corps being the Nagpore Rifles raised in 1860. The movement owed its origin to the impression left by the events of 1857. Since that time it has been slowly but surely increasing in size and importance. Thus in 1882-83 the number of efficient volunteers was 9,422, whilst the last return shows that in 1887-8 these had increased to 13,098.

Number of railway and other volunteers.

I shall have occasion shortly to compare these figures with those showing the available European and Eurasian population, and for this purpose it should not be lost sight of that on all our lines of railway in India, volunteering is, in practice if not in theory, a condition of appointment. We find, accordingly, that in 1882-83 there were 3,014 efficient railway volunteers, and that in 1887-8 their number had increased to 4,431. Thus for the remainder of

4. Any other persons filling positions of such responsibility as to be necessarily exempted, but these would be few, as such positions are rarely attained under 40 years of age.

Tax on those found unfit.

With a view to deterring persons from feigning disease in order to escape service, it might be well to adopt the plan in force in Switzerland, by which all persons declared medically unfit for service (not being paupers dependent on public charity) are subject to a special annual tax in lieu. In Switzerland this tax consists of a personal contribution of 6 francs per annum and, in addition, of a supplementary tax, in proportion to the fortune or the income, on the following scale :—

	Francs.
Per 1,000 francs of fortune, net ...	1-50 per annum.
Per 100 francs of income, net ...	1-50 per annum.

Provided that no person shall pay more than 3,000 francs per annum. Fortunes under 1,000 francs are exempt and 600 francs is to be deducted from the income of every person liable before commencing to calculate the tax.

In India an annual personal charge of Rs. 5 and an increase of 1 per cent in the income tax would probably be found effective.

Having, then, got the men it next becomes necessary to consider how they should be organized and what amount of training they would require.

Three methods of organization.

Now, it will be seen at once that there are three distinct modes of organization applicable to such a force as I am suggesting. These may be stated as follows :—

(1.) By abolishing the volunteer organization and forming the whole force into compulsory regiments and batteries of militia.

(2.) By retaining the volunteers on their present footing and forming the non-volunteers into separate corps.

(3.) By extending the volunteer organization so as to embrace the whole force.

These three systems will evidently require very different arrangements and therefore it is necessary to decide, at the outset, which it would be best to adopt, bearing in mind that the present problem concerns local defence only.

Advantages of the first system.

Taking the systems in their order; the first has the advantages of simplicity and homogeneity—every man serving under precisely similar conditions—but there it may be considered that its advantages end.

Its disadvantages.

A force in which every man is serving compulsorily must, during its periods of training, be subject to military law and must be fully officered by men thoroughly trained to their work and well able to preserve discipline. These officers could not form a portion of the regular army. That army would, in war time, require every officer it could get and indeed, during the next great war, it seems likely that want of officers will be one of the greatest difficulties of the Indian army. Clearly they would have to be a separate body. But such a corps of officers would entail a most serious expense and one not to be lightly encountered even if the required stamp of officer was forthcoming, which would be doubtful unless they were placed on the same footing as officers of the regular army as regards pay and pension.

Major GRAY suggests four sources from which officers for such a force might be drawn;—

(1). Military officers doing general duty or unattached.

(2). Military officers on the pension or invalid establishment.

(3). Persons who have retired after not less than 3 years service in the regular army.

(4). Selected members of the militia force.

Of these the first, having of late years been greatly decreased in numbers, are now so few as to be of no practical importance in such a far-reaching scheme. Of those in the second category there are, and always have been, very few domiciled in India and these nearly all reside at one or two of the hill stations and are, with few exceptions, close on or over 60 years of age.

The third class are also few and, as a rule, have not served in the commissioned rank. Thus the great majority of the officers would have to be selected from the fourth class. These men might be of a stamp which would furnish excellent volunteer officers but it is scarcely possible that, as a body, they would be equal to the much more difficult task of drilling and disciplining men undergoing compulsory training.

Again from the point of view of inducing the European and Eurasian population to submit to any form of universal service, this organization would have the great disadvantage of obliging everyone to submit to military law during the annual training periods. This, though perhaps an advantage from a military point of view, would undoubtedly render the whole scheme very unpopular with the great body of those affected by it.

The abolition of volunteering would also be considered a great hardship by those men who have been patriotic enough to render themselves efficient volunteers under the present system and who certainly have a special claim to consideration in consequence.

Consideration of the second system.

The second system, while sacrificing the homogeneity of the force, is open (though, no doubt, in a less degree) to the arguments I have urged against the first system in so far as these relate to the difficulty and expense of officering the compulsory part of such a force.

On the other hand, it provides a means of avoiding military law in time of peace for those who choose to avail themslves of it and leaves the present volunteers unaffected by the proposed change. This system, clearly, has many advantages but in my opinion they are outweighed by the difficulty and expense of providing officers. Supposing however, that this had been surmounted, I think that even then the scheme would not be found to work easily in time of need except in the larger stations. An example will perhaps make clear what I mean. Suppose the very common case of a small station containing, say, 30 able-bodied Europeans and Eurasians, of these 15 would be, in all probability, volunteers—and the remainder militiamen. Under no system, not involving ruinous expense, could a militia officer be maintained at each such station. Volunteer officers, on the other hand, being cheap, are plentiful and there would be every probability that one would be found at each such station. In this case, if the force were called out, the volunteer officer would of course command the whole, the volunteers and the militiamen would be amalgamated to form one small company and the distinction between the two branches of the force would, for the time, cease to exist. Since this would occur in practice at the great majority of stations it appears to me that a really practicable scheme must take this into account and this fact, together with the great economy involved, leads me to consider the third scheme as that which is, on the whole, best suited to the local conditions in the India of the present day.

Put shortly, what I would suggest is this :—

Statement of the proposed system.

First—that in time of peace volunteering should be carried on under conditions generally similar to those at present in force, all non-volunteers forming what, for the sake of distinction I propose to call the general levy, and that the regulations for training should be so arranged that the great majority of men should find it to their advantage to volunteer rather than to serve in the levy.

Secondly—that the training of the minority who would belong to the levy should be carried out during peace time by officers detached for this duty from the regular army, who would rejoin their regiments at the end of the annual training—such training to be carried out under military law.

Thirdly—that on embodiment for actual service, the levy men should become part and parcel of the nearest volunteer corps (now under military law) and should serve under the same volunteer officers and on the same conditions as volunteers in all respects.

Arguments in its favour.

This scheme appears to be both practicable and cheap. Although volunteer officers would be hardly capable in peace time of disciplining men serving on compulsion and under military law yet, if such a state of affairs existed in India as to justify the embodiment of the volunteers and levy for local defence, the danger to each individual would be certainly sufficient to induce him to submit willingly to any discipline in order to assure his own safety.

The most serious objections appear to me to be that the men would not serve under officers by whom they had been trained and that it might not always be very convenient to detach regular officers for this duty. In the case of troops required for strictly local defence only, the former of these is of little moment, and, as to the latter objection, if the dates of embodiment were judiciously arranged so as to permit officers to pass on from station to station no very large number of them would be required to carry on this duty. No training higher than company drill would be required and the levy men need not be trained in their own stations but might be required to attend at some central point where not less than 50 or 100 could be embodied at one time. If men found this inconvenient they would have their remedy in volunteering.

Details of the scheme as regards volunteers.

Having thus briefly sketched out the scheme I would propose, it remains to consider it more in detail.

Training.

As regards the amount of training to be required, it might be demanded from all volunteers that they should render themselves efficient under the present regulations with, if possible, the addition of an annual week in camp wherever the number of volunteers was sufficient, but no volunteer should be required to leave his station for training without his own consent.

In the event of a volunteer failing to render himself efficient, he should at once pass into the levy unless specially recommended by his commanding officer for retention in the volunteers. Failure to become efficient in two consecutive years unless caused by ill health, should transfer a man to the levy without appeal.

After a volunteer had been efficient for five years he might be excused all drills except the annual week in camp.

Discipline.

With a view to the improvement of discipline in the volunteer ranks I would give power to the commanding officer or to a regimental court-martial, as might be judged best, to dismiss any volunteer whose retention might be deemed unadvisable in the interests of the corps. Such men would thereupon become members of the levy.

Capitation grant.

I do not think there would be any necessity to increase the amount of the capitation grant. The present amount, of Rs. 20 for each efficient, with Rs. 10 for each extra efficient and Rs. 25 for every qualified officer and sergeant would appear to meet the wants of the case. In other ways, however, Government might assist the corps funds. Perhaps the best way of doing so would be by fixed annual donations to specified funds on the principle of the monthly allowance now made to the mess and band funds of regular regiments. Tents and transport should also be provided for men going into camp, with rations, or allowance in lieu, while under canvas.

Pay when called out.

If called out for service all ranks would of course, stand on the same footing as British regiments in regard to pay.

Appointment of officers.

I think it would be unadvisable to interfere with the present system, under which officers are chosen by the volunteers themselves, so far as regards first appointment to the commissioned rank, but the commandant should have a power of veto. After that, however, the men should have no voice in the matter of promotion which should be given on the recommendation of the commandant, and, as far as possible, regimentally.

Under a system of compulsory service it is probable that the best men would be willing to accept commissions provided they were put to no expense. Therefore, I think, Government should on the first grant of a commission, supply uniform, arms and accoutrements or give an allowance in lieu, and that all unavoidable expenditure (other than personal) should be recoverable on contingent bills.

The principle which should guide the dealings of Government with the volunteers under a system of compulsory service should be that while, on the one hand, volunteers give their services without pay, on the other hand, Government should see that they are put to no expense by so doing. If in addition to this a little judicious encouragement in the shape of honours, decorations or honorary rank, were granted for good service, there would be no lack of officers of the right sort, who might well be required to qualify themselves, by passing the necessary examination, before appointment, instead of, as now, at some practically indefinite time afterwards.

Details regarding the general levy.

Turning now to the case of the levy; I have suggested that the regulations should be such as to render this service less attractive than volunteering. This need not necessitate any very great length of annual training.

The mere facts of their annual embodiment taking place under military law and usually at stations other than those at which the men would be resident would of themselves be sufficient to cause the great majority of men to prefer the volunteers.

Training.

The training, then, need only be of such length as to bring men up to the ordinary standard of an efficient volunteer but, taking into consideration that all the men with any real aptitude for soldiering would almost certainly be volunteers, I do not think it would be possible to fix the period at a less duration than 14 days. If this period was fixed on to commence with, there could be no difficulty in raising or lowering it afterwards as experience might direct.

In the same way the reduction of the annual period, after a certain number of trainings, would have to depend on whether it was found that this could be done without making levy service too attractive.

Preliminary drill.

I do not think any long period of preliminary drill, such as is given in the English militia, would be necessary, but if it was decided on it would be best carried out at the nearest military cantonment.

Pay.

During embodiment levy men would require to be placed on the same footing as British soldiers as regards pay, rations, etc. Any Government servants would probably continue to draw their usual pay only—all special charges being met by Government.

Officers and N. C. O.'s for levy.

Adjutants of volunteer corps would probably be able to give considerable assistance in the training of these men. Non-commissioned officers would have to be found for them, for it is not likely that the sort of men who would be found in the levy would furnish a good class of non-commissioned officer. Part of the work might be done by sergeant instructors of volunteers, but the remainder of those necessary would have to be detached for the duty from British regiments, as in the case of the officers. There might be some little difficulties in doing this but I think it might be overcome by proper arrangements, and their having no non-commissioned officers of their own would make it easier to amalgamate the levy with the volunteers when called out for service.

The government of the force.

The present volunteer force is directly under the Government of India and the Local Governments, not under the Commander-in-Chief. Whether this arrangement should continue is doubtful. On the one hand it is argued that it is right that a force intended solely for local defence should be under the direct control of the civil authorities who are primarily responsible for the maintenance of law and order in the various provinces of the Indian empire. On the other hand a considerable gain in military efficiency would be likely to result from the placing of the force directly under the military authorities. So long as the separate presidential armies under Commanders-in-Chief are maintained the present arrangement might remain in force, but should the recommendations of the Simla Commission be, at length, acted on and the whole force in the country be brought directly under one Commander-in-Chief in India, it would then, I think, be found of great advantage to place the whole of the volunteers and general levy under his control as a part of the armed strength of the empire.

Inspector General necessary.

Until this can be done it would be very desirable to create a special branch of the Military Department of the Government of India headed by an Inspector General of Volunteers and Levy, with deputies at Madras and Bombay. It would be the duty of these officials, by constant inspection, to keep themselves thoroughly acquainted with the condition of the force for local defence, its wants and wishes, and to form a channel of communication between it and the civil government. The want of such an appointment has long been felt even in the volunteer force as at present constituted.

The limit of distance.

Another point intimately connected with the foregoing is the question of the limit of distance within which the members of the force should be required to serve. By sec. 16 of Act xx of 1869 this limit is fixed at four miles. This limit is undoubtedly too small, but in a force raised solely for local defence there must be some limit, for, especially in the smaller stations, men would be very unwilling to serve at any great distance from their wives and families during times of danger. Still, when private feeling clashes with public expediency the former must usually give way and in this case I think the limit should be fixed at the maximum possible without endangering the acceptance of the scheme. This would probably coincide with the limits of the collectorate in which each man might be resident. From a purely military point of view the best limit would be that of the province but at present at all events, I doubt if this could be introduced.

The initiation of the scheme.

The initiation of such a scheme would have to be carefully arranged. Were it certain that time would be available, the simplest and best method would be to make the liability wholly prospective so as to apply only to those who might reach the military age, or arrive in India for the first time, after a given date. To do so, however, would require 20 years before the organization would be in full working order, and thus it is necessary that a large portion of the men now available should be brought under training at once. After a certain age men are not easily rendered efficient even in the simple duties which would be required from such a force. If this age be assumed at 35, it would be well to exempt men now over that age from training of any sort—merely enrolling them at once in the reserve of the levy, and maintaining the necessary arms and accoutrements for them in the armoury of their station.

Armoury.

Such an armoury would be a necessity at every station. The levy men could not be trusted to look after their arms during the period between annual trainings, and even in the volunteers, as at present constituted, a considerable number of arms are damaged or stolen through neglect on the part of the men when they are left in their individual charge.

What arms the force should be of.

As regards the arms of the service to be represented in the proposed force, I find that there are at present in India and Burma, 59 volunteer corps, of which 47 are rifles, 5 light horse, 2 mounted rifles, 4 artillery, and 1 naval artillery. For local defence, volunteer rifles are, clearly, the most useful arm, and being the easiest to train and equip, are likely to retain their popularity, especially among the poorer classes of the community. Mounted rifles, also, would (especially in large scattered districts) be of the utmost value, and it would be a great step in advance if a portion of every corps could be thus trained.

Artillery and Engineers urgently required.

More artillery volunteers are greatly required and batteries should, if possible, be formed at all stations where forts exist. Volunteer engineers are a great want, as was pointed out by Mr. G. L. MOLESWORTH, in a paper read before the Indian U. S. Institution in June, 1885. Under certain circumstances, indeed, such corps would become invaluable, as will be evident when it is considered that there is not a single company of European sappers in India.

Mr. MOLESWORTH suggested turning all railway volunteers into engineers. General CHESNEY, however, in discussing this proposal, rejected this as too sweeping, and, while fully admitting the necessity of volunteer engineers, considered that one or two companies from each railway volunteer corps so organized would meet the case.

Having regard to the nature of the service likely to be required from volunteers, and the fact that, owing to their small numbers at out-stations, they would generally be on the defensive, it would seem advisable that as large a proportion as possible of every corps should receive instruction in such simple branches of field engineering as would admit of their placing (for instance) a building in such a state of defence as would enable it to be obstinately held against an enemy not provided with field artillery.

The supplying of machine guns to the force in considerable numbers would greatly raise its defensive value.

General value of the scheme.

I have touched only on some of the more important details of the scheme which I have proposed. The limit of space allotted to this essay requires that I should now pass on to the consideration of the second branch of my subject. I have, I hope, written sufficient to demonstrate the defensive value of such an organization. By its means a force of from 70,000 to 80,000 men, armed, organized, and partly trained, would be called into existance. On this force the Indian Government could absolutely rely during an emergency, and it would be capable, if necessary, of holding India for a time with little or no assistance from the regular British troops, who would be thus set free for service in the field.

Would it be accepted by those concerned.

The one factor in the problem which cannot be satisfactorily solved is whether the scheme would be accepted by the men of European descent in India. With this point steadily in view I have endeavoured to minimize in every way the sacrifice to be demanded of them. Its advantages are clear and, probably, no man who fairly faces the question will be disposed to deny the great benefit, in increased personal security, to be gained from it by each member of the community. Still it is impossible to overlook the strong distaste for any form of compulsory service which is shown by Englishmen in England, or to predict how far they will be influenced by similar feelings when resident, under very different conditions, in India.

Were it possible to disregard this factor and that of expense, it would be by no means difficult to frame a scheme which in simplicity and military efficiency should be infinitely superior to that sketched in these pages.

I have, however, endeavoured to direct my proposals to an organization which is practicable, and which might possibly be accepted by those concerned, rather than to one which, while more perfect in theory, would prove unworkable in practice.

Part II.

It is now necessary to turn to the other branch of the subject, namely, organization as auxiliary to the British forces.

Purposes of this organization are imperial rather than local.

Evidently such an organization stands on a very different footing to one required for local defence only. The latter, as I have attempted to show, is so intimately connected with the personal safety of Europeans and Eurasians in India that it is to their advantage, on purely selfish grounds, to make some sacrifice to attain the end in view.

Service as auxiliary to the British troops, as distinguished from local defence, means taking part in a much more direct manner in the defence of the Indian empire against external foes, that is to say such a force would be required either as second line troops to serve on the communications, or as garrison troops to hold important fortified posts during the absence of British troops on active service. This organization then is required for the defence of the empire against external foes which is an imperial rather than a local object. Though it might be possible to justify in theory the enforcement, for such purposes, of compulsory service on Englishmen resident in India, whilst Englishmen at home remained free from a similar liability, still it may be looked on as practically certain that they would refuse to submit to any such burden. For it must be recollected that a large proportion of those concerned have wives and children, a fact which, while rendering them more willing to serve locally for protection of life and property, would also render them very unwilling to serve at any great distance from their homes, leaving their families unprotected during a time of danger in India.

The Canadians are the only branch of the English speaking race who have heartily adopted the principle of universal service, yet even in Canada the ballot for the militia has never been enforced, the whole active force being composed of volunteers.

Therefore compulsion hardly possible.

I think, then, that in India the feeling of the white population would necessitate the raising of the required force by voluntary enlistment.

Major Gray's suggestions.

In his paper, already referred to, Major Gray made the following suggestions for the establishment of local Eurasian regiments as auxiliary to the British troops.

"There is a considerable population of European descent in this country which has not education sufficient to earn its livelihood with the pen, which has no opening for the practice of handicrafts, which is not admitted into the ranks of European regiments, which cannot dig, but which, as demonstrated in 1857, is perfectly capable of military service. From this material might be enlisted local battalions of infantry and garrison companies of artillery at the presidency towns and other great centres, such as Allahabad, Lucknow, &c.

"This unworked field would supply probably, several such battalions and companies, which if not so efficient as the regular European troops, would also cost much less. Being strictly local and not leaving their fixed head-quarters except to take the field the men could live with their families on less pay and advantages than are requisite for English soldiers in India; they would not be imported and exported at the great cost of that soldier; and they would be ready seasoned to the climate and would not require nearly so much outlay in housing and other measures to keep them in health."

The objections to this scheme.

This scheme seems to me to be open to very serious objections. In the first place it assumes a most unadvisable diminution of the strength of the British troops in India in order to find the money to pay for these local troops. But, even supposing that these regiments were to be raised in addition to, instead of in place of, the full strength of British troops,I believe that their assumed cheapness would be found to be an illusion.

In the first place, I have a very distinct recollection of a long and interesting correspondence on this subject, in the *Pioneer Newspaper* in the spring of 1885, and, though unable to refer to a file of that paper, I remember that those who claimed to write in the name of the European community declared most distinctly that no scheme which included any difference, in pay or general treatment, between European and Eurasian regiments would have the smallest chance of success. They declared, and I think rightly, that any practical scheme must be based on the principal of binding closer together all men of European descent and must therefore exclude anything which would tend, directly or indirectly to accentuate the difference between men of pure and those of mixed race.

I think it will be admitted that Eurasian regiments, if raised, must be long service regiments, for the simple reason that a sufficient supply of recruits would not be forthcoming to support a short service system. Long service, however, entails pensions and this would mean a very considerable addition to the expense. Officers also, of whom there could hardly be less than 27 per regiment, would necessarily receive pensions at Staff Corps rates from the Government of India, and many other sources of expense might be pointed out. It seems then that such regiments, while avowedly inferior to British troops, would be almost, if not quite, as costly.

Regiments of militia as in England are impracticable.

Regiments of militia, organized, and officered after the English model have been suggested, but I doubt if they could be made a success. To render such corps worth their cost they would have to be embodied for an annual period not less than that required from militia in England, viz., 28 days. There is no class of persons in India, in regular settled employ, who would be able to spare the necessary time, nor would the pay be sufficient temptation to induce them to abandon temporarily their ordinary avocations.

Those who would enlist would be those with no settled employment, and consequently of the lowest class and of the least education, who, though useful enough in corps where they were leavened by a good proportion of men of better class, would, by themselves, be unpromising material for soldiers. Even these, except in the case of the largest centres of population, would have to be recruited over very large areas in order to obtain corps of an efficient strength. The want of a leisured class from which to obtain militia officers would of itself be an almost fatal objection.

Men are willing to fight but not to undergo any long annual training.

There is little doubt, however, that, in India as in England, there are many men who, though unwilling or unable to undergo the sacrifice entailed by prolonged annual embodiment during peace, would be ready and willing to serve in an auxiliary force during an actual war with Russia, which is practically the only contingency when such a force would be required. These men would be those possessing the military instinct in the highest degree and would be, in fact, the very men best suited for the purpose. The problem is how to make them available.

Scheme for a "Volunteer Reserve."

I think the germ of the required scheme is to be found in the English Militia Reserve.

As in England a militiaman is permitted to enroll himself in the Militia Reserve, receiving an annual bounty for so doing, but remains a militiamen for all purposes, unless actually called out for active service, so I would suggest that men belonging to the Indian volunteers or general levy should be permitted to enroll themselves in a force which I may call, for want of a better name, the "Volunteer Reserve."

These men would receive a bounty, payable, as in England, in annual instalments, and, unless called out for service, would remain for all purposes volunteers or levy men. On the outbreak of war, or in case of "imminent danger or great emergency" these men would be available for formation into corps at various centres, to be designated beforehand, and where all stores necessary for their mobilization should be always maintained.

There would be little or no difficulty in officering such a force.

Reserve of officers.

Suitable volunteers might be permitted to enroll themselves in a reserve of officers as is done in England, with similar qualifications and liabilities. This should not be limited to officers of volunteers only. Men of good social position, even if in the ranks, should be allowed to enroll themselves on proving themselves qualified, for, in some corps, such for instance as the Behar Light Horse, the ranks are full of men of the stamp required.

Three-fourths of the commissions in the auxiliary regiments might be given to men thus obtained, the remaining fourth I would fill by officers of the Staff Corps whose places in their own regiments might be filled by reserve officers.

These would be gentlemen well acquainted with the native languages and accustomed to deal with natives. I am confident that they would make very efficient officers of native infantry. Since embodiment of the reserve would take place only in the event of a great war there would be no difficulty, at its close, in filling up a part of the vacancies which it would cause by granting Staff Corps commissions to reserve officers who had done good service.

There are numbers of men in India—indigo planters, tea planters, and many others—good linguists, active, energetic, excellent horsemen and accustomed to organize native labour, who would form admirable British officers for the native army, and to whom the prospect of gaining such commissions would form the the very strongest inducement to come forward.

I may perhaps be permitted to remark in passing that I have long been convinced that the formation of such an Indian reserve of officers is the only practicable method of supplying to our native troops that increased number of English leaders, acquainted with their language and feelings, which it is admitted that they would so urgently require if called upon to fight European troops.

Period of enrolment.

The periods for which men should be permitted to enrol themselves as privates in the volunteer reserve should be sufficiently long to avoid the inconvenience of continual re-engagements and at the same time not of such length as to make any very great deterioration probable in the individual man. These conditions would be satisfied by enrolment for periods of five years with power to re-engage up to a fixed limit of age if found, in all respects, medically fit.

This limit of age is fixed in England at 34 for the militia reserve and at 45 for the militia itself. Neither of these limits appear quite suitable to Indian local conditions. The duties of the volunteer service, which is intended only for use in second line, have more affinity with those of the English militia than with that of the militia reserve, which is intended to fill up the regular regiments, but on the other hand men deteriorate more quickly in India than at home so that it might be best to fix the age limit in India at 40 years, after which age no man would be permitted to re-engage.

Supply of N. C. O's.

Their non-commissioned officers would have to be supplied from their own ranks. There would be no difficulty about this as many of them would have served as non-commissioned officers of volunteers.

Force to be only embodied for war.

It would be unnecessary to embody this force in time of peace. Every officer and man would be receiving his annual training elsewhere under the arrangements proposed for local defence, and if the arrangements for mobilization were placed on a satisfactory footing thoroughly understood by all concerned, and if all the necessary stores were maintained at the centres designated for embodiment, the force could be mobilized with great rapidity and would, in a very short time, be in a condition to take the field.

Pay on embodiment and bounty during peace.

Such a force on embodiment would be treated in all respects like ordinary British regiments. During peace an annual bounty would be necessary, the amount of which it is difficult to fix as it would depend on the strength which it was proposed that this force should attain, and would therefore, in all probability, vary from time to time according as the establishment of the force was fixed at a higher or lower figure.

The bounty in England is £1 per annum, payable in advance and there appears to be but little difficulty in keeping up the establishment, which is fixed at one-fourth of the effective strength in infantry and one-third in artillery militia.

Taking into consideration the great proportion of unmarried men in India, the fact that no extra duty need be required during peace, and that their services would only be called for in the event of war with Russia, it appears to me that if the strength of the force was fixed at, say, 10,000 men, a bounty of Rs. 20 per man per annum would be sufficient to secure their enrolment. In the absence of any reliable data for calculation any such estimate as this can be regarded merely in the light of a guess, and experience alone can form a trustworthy guide in such matters.

Cost of the force.

Accepting this estimate as approximately correct, such a force would cost but 200,000 rupees per annum, exclusive of the stores necessary for mobilization, which, once provided, would cost little to maintain. A quarter-master with a small native establishment would be necessary to look after the stores of each battalion.

Its duties and uses.

Although such a force would be unfit for duty in the first line until, at all events, it had been some time embodied, it appears difficult to over-estimate its value if confined to its proper duties of service in garrison or on the lines of communication. In such situations it would be equal to any duty which would be required of it and, by releasing British troops for service in the front line, it would be nearly equivalent to the addition of a similar number of men to the European army in India, at a cost which would be really infinitesimal in comparison if it be true, as stated, that a regiment of British infantry in India costs the State Rs. 600,000 per annum.

How the money might be found.

It is perhaps scarcely within the scope of this essay to suggest means for obtaining the money necessary for such a force, but if my estimate of Rs. 200,000 per annum be accepted as not unduly low, it will appear that this is about the annual cost of three native infantry regiments, and, if money could not otherwise be allotted for the purpose, it would probably be well worth while to reduce the native army in each presidency by one regiment if by so doing a force of this nature could be obtained.

Force not to contain mounted troops.

As regards the arms of the service to be represented in the auxiliary force, it would probably be advisable to have no mounted troops, owing to difficulty of equipment and training and to confine it entirely to infantry, garrison artillery and engineers.

Great necessity for Engineers.

These last would be emphatically necessary as a part of this force. It must be borne in mind that the whole strength of sappers in India is but 21 companies, of which eight are in Bengal, eight in Madras and five in Bombay. The whole of the rank and file of these are natives. Now according to the composition laid down by the Simla Commission for a force on active service, an army corps of two divisions would require six companies of sappers. Therefore we only maintain in India sufficient sappers for three and a half such corps, without making any provision for the companies which would be required on the lines of communication. Thus it is probable that the want of sappers would be felt very early in the campaign and the formation of volunteer engineer corps and the enrolment of men from those corps in the volunteer reserve would be a subject worthy of special attention and encouragement.

Mobilization under military authorities.

All the arrangements for the mobilization of this force would, of course, be under the control of the military authorities.

Summary of proposals.

In conclusion, it may be convenient to sum up shortly the suggestions which I have ventured to put forward in this essay. As regards local defence of life and property, I have endeavoured to show the necessity of training and organizing, under general liability to service, every man in India, whose blood is wholly or in part European, with a view to rendering them self sufficient for their own protection should the course of events compel the denudation of the country of European troops. I have pointed out how I think this could be done at a minimum of expense and without making any very great demand on the time of the civil population.

In the case of organization as auxiliary to the British troops I have urged that such service must, under the present condition of affairs, be entirely voluntary and have recommended that the men should be obtained by the payment of bounties and that the force should be liable to embodiment, only in case of war.

I do not claim for this scheme any great novelty of idea or rounded perfection of theory. Cheapness and practicability are the leading ideas to which everything else has been subordinated.

Conclusion.

In any country in which the ruling race is greatly out-numbered by the ruled it is necessary that the former should compensate by superior organization for numerical inferiority. It is incontrovertible that the great mass of our Indian fellow-subjects look upon us as aliens and intruders, to be served and obeyed only so long as we can make ourselves feared. When our time of trial arrives and we meet Russia in the final struggle for supremacy in Asia, help from England cannot be depended on with any certainty we must be prepared to rely on our own resources. Such being the case, it behoves the English in India to face the situation calmly and deliberately.

There need be no fear of failure if it be once clearly realized by the European and Eurasian civil population that, in India, they are, and must continue to be, "Strangers in a Strange Land."

SECOND ESSAY

By Captain A. H. Mason, R. E.

Vicinus urit Ucalegon.[*]

Virgil.

Necessity of being prepared for coming troubles in India.

In a book published not very long ago, *Extracts from the Diary of Henry Greville*, the writer adverts to the noble speech made by Lord Derby, immediately after the death of the Duke of Wellington, in which he said "to maintain the security and permanence of peace, every nation must have within itself the means of self-defence and of self-independence, which should not provoke aggression by its weakness, if to that weakness be added the possession of boundless wealth. In order to be peaceful England must be powerful, and if England ought to be powerful she ought to be so only that she should be more secure of peace." The same truth was expressed by Sir Henry Lawrence when he said that in India we can afford to be pacific, but we cannot afford to be weak. It behoves us under every view of the case to keep up our strength. Debility, the result of apathy and negligence, would be nothing short of a state of crime. There are few national as well as there are few bodily ailments, which have not their seat in debility; and any apparent symptoms of weakness in the dominant power in India, might, at any time plunge the country into a terrible state of disorder, and gird about with desolation every province of this vast empire.

In the letters written by Napoleon to his brother Joseph, when King of Naples, there are some lessons which we might do well to take to heart in India, where Englishmen are situated somewhat as Frenchmen were in Naples in 1807. Those who argue that good governments may trust to the love of the people, should bear in mind Napoleon's emphatic words "what a nation most hates is another nation." This remark might apply to England's position in India. Justice, humanity, and kindly consideration, must be ever displayed, but be closely backed up by guns and bayonets, or else the very mildness of British rule will ensure its own destruction. Napoleon tells his brother "in all your calculations, assume that a fortnight sooner or later you will have an insurrection." This advice is constantly and emphatically enjoined, and is specially applicable to us in this country, where it is necessary to act on the motto *arma pacis fulcra** in its widest sense. Wellington's maxim of "keeping the troops out of sight" answered for England; but it will not answer for India. The people of this country, if order is to be maintained, and obedience exacted, must see that there is the strong arm ready to enforce law and order.

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[*] "Your neighbour Ucalegon's (house) is on fire." It means the danger is approaching to you so nearly as to demand your utmost exertion.

The very want of precaution invites attack. Common prudence makes it necessary to take a calm estimate of every possibility, in order to be prepared. There is no greater mistake than postponing necessary measures until the day of action. What we have to do in India, is to prevent war or insurrection, by timely preparations. It has been recorded by the historian Kaye, that Lord Metcalfe, when in India, used to retire at night, with the expectation of finding, on awakening, that India had slipped from our grasp.† Whatever we may think of such an expectation, there can be little question that Lord Metcalfe's advice, for caution and preparation, —for looking in peace for the possibility of war, was both practical and sagacious.

In this connexion we may recall the words of the Duke of Wellington, "there is nothing so necessary as to look forward to future wars, and to our early preparation for them." This is what the English people are slow to understand, and as Sir Charles Dilke truly says, in one of his articles on the subject of our national defences in the *Fortnightly Review*, they put their faith "in luck and pluck," and if ever an uneasy feeling arises in the public mind it is banished in the same sort of way that most people dismiss the uncomfortable feeling of the certainty of death. There are a great many Englishmen, who in this way, trust to the national good fortune, and the national courage, to guard them against dangers, which their reason and their knowledge lead them to know are real.

On the 30th November last, before resigning the reins of Government in India, the then departing Viceroy, Lord Dufferin, made a speech full of the greatest political significance, in which he clearly pointed out the vast and varied responsibilities of the British rule in India, and in no uncertain terms passed judgment on the mischievous political agitation which has been set on foot in India during the last few years.

Englishmen reflect too little on the unique position occupied by the British nation in this country—a mere handful of men in the midst of a vast population of 257 millions of souls, extending over an area of more than one and a half millions of square miles—and if the words of the late Viceroy of India shall have stirred up a desire on the part of our countrymen to look round and take stock of our resources, in the event of trouble arising from within or without, they will not have been spoken in vain.

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*This is the motto of the oldest volunteer corps in England.

† Kaye's *Correspondence of Lord Metcalfe*, 185

This is said in no alarmist strain, it is simply a matter of ordinary prudence. No other nation in the world would, if in our position, be content to go on living in the way we do, without being quite certain, that in the case of trouble arising every eventuality had been provided for as far as possible. The argument that to make these preparations, when everything is quiet and the political horizon is clear, is likely to create distrust and bring on the very danger we seek to avoid, is hardly worth answering. It is in times of peace that they *must* be made, when the danger arrives it will be too late. This was our mistake in 1854, when after forty years of peace, the Russian war suddenly came upon us, and found us unprepared. The Mutiny of 1857, three years later, burst upon us unexpectedly, with little or no previous warning, and again our organization was found to be incomplete; and it was only after the expenditure of thousands of valuable lives, and millions of treasure that the rebellion was suppressed.

History furnishes numerous other instances of the same thing, and the necessity of being prepared is so obvious, that *on ne cherche point à prouver la lumière** if it were not that experience has shown, that we so soon forget the lessons and warnings of the past, and drift back again into the old groove, trusting to "luck and pluck" to carry us through if an emergency should arise.

It is said that a certain bird, when hard pressed in its flight buries its head in the sand, and finds imaginary security, because it ceases to see the near approach of danger; and the present policy pursued by this country in the matter of defence, appears to us somewhat analogous. By this want of timely preparation for possible coming troubles, and the neglect of the most ordinary precautions, are we not rashly tempting the fate of Phaeton when he undertook to drive the chariot of the sun?

Our present position in India.

Before entering upon the immediate subject of this paper, it will be well to review shortly our present position in India, and the possible dangers to which we are exposed. The former was shown by the late Viceroy in the speech above alluded to, to be one of immense responsibility and fraught with obligations which we cannot get rid of even if we would.

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* This French proverb is meant to convey the idea that it is idle to adduce proofs of that which is self-evident.

The Indian empire is equal in size, if Russia be excluded, to the entire continent of Europe, with a population of 257 million souls. This population is composed of a large number of distinct nationalities, professing various religions, practising diverse rites, speaking different languages. The *Census Report* says there are 106 different Indian tongues, of which 18 are spoken by more than a million persons; while many of them are still further separated from each other, by discord and prejudices, by conflicting social usages, and even antagonistic material interests. Perhaps the most patent peculiarity of our Indian cosmos is its division into two great political communities—the Hindus, numbering 190 millions, and the Muhammadans numbering 50 millions—whose characteristics whether religious, social or ethnological are distinct. But to these two great divisions must be added a host of minor nationalities— though minor is a misleading term, since most of them may be numbered by millions—who, though some are included in the two broader categories above mentioned, are as completely separated from each other, as are the Hindus from the Muhammadans; such as the Sikhs, with their warlike habits and traditions and theocratic enthusiasm; the Rohillas, the Pathans, the Assamese, the Baluchis and the other wild and martial tribes on our frontiers; the hillmen, dwelling in the folds of the Himalayas; our subjects in Burma, Mongol in race and Buddhist in religion; the Khonds, Mers and Bhils, and other non-Aryan peoples in the centre and south of India; and the enterprising Parsis, with their rapidly-developing manufactures and commercial interests.

Besides providing for the safety and welfare of all these races, we are bound to protect the large East-Indian community, the indigenous Christian churches, the important planting and manufacturing interests, which are scattered over the face of the country, and also to secure the property and lives of all the British residents in India—men, women and children—whether employed in the service of the Government, or pursuing independent avocations in the midst of alien and semi-civilised races, whose peaceable and orderly behaviour cannot under all circumstances be implicitly relied on.

If, again, we turn our eyes outwards, it will be found that our external obligations are hardly less onerous and imperative than those confronting us from within. India has a land frontier of nearly 6,000 miles, and a seaboard of about 9,000 miles. On the east she is conterminous with Siam and China, on the north with Tibet, Bhutan and Nepal, and on the west she marches, at all events diplomatically, with Russia. On her coasts are many rich and prosperous seaports—Calcutta, Bombay, Madras, Karachi, Rangoon—and every year we are made more painfully aware, to how serious an extent our contiguity with foreign nations, whether civilised or uncivilised, and the complications arising both out of eastern and western politics, may expose us to attack, and of the necessity of walking both warily and wisely in respect of our international relations, and of taking those precautions, however onerous or expensive, which are incumbent on every nation that finds itself in contact with enterprising military monarchies or rival maritime powers.*

Possible dangers to which we are exposed.

Next with regard to the possible dangers to which we are exposed. The attitude of Russia on our north-western frontier is one source of danger.

In the extension of her territories in Central Asia, Russia has always worked on fixed principles and followed a uniform policy. This policy was aptly described by Lord Palmerston in a letter to Lord Clarendon, dated the 31st July, 1853. "The policy and practice of the Russian Government has always been to push forward its encroachments, as fast and as far as apathy or want of firmness of other Governments would allow it to go, but always to stop and retire when it was met with decided resistance, and then to wait for the next favorable opportunity to make another spring on its intended victim. In furtherance of this policy the Russian Government has always had two strings to its bow—moderate language and disinterested professions at St. Petersburg and at London; active aggression by its agents at the scene of operations. If the aggressions succeed locally, the St. Petersburg Government adopts them, as a *fait accompli* which it did not intend, but cannot in honour recede from. If the local agents fail they are disavowed and recalled and the language previously held is appealed to as a proof that the agents have overstepped their instructions."† This policy persistently pursued, has enabled Russia to advance her frontier in the direction of India, to within easy striking distance of Herat, and it is impossible now to say, how long it may be before we are called upon to enter into a mortal struggle with that power for the possession of our great dependency. How very near we were to such an eventuality in 1885, will be fresh in the mind of every Englishman.

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* *Vide* Lord Dufferin's speech at Calcutta on the 30th November 1888.

† *Life of Lord Palmerston*, Vol. II, p. 273, 12 mo. ed.

There are some who consider, that the real power of Russia has been greatly exaggerated, but this is certainly not the opinion of well-informed English and foreign officers. The latest books, written both in friendly and unfriendly countries, on the subject of the Russian attack upon India, lay down the proposition that we shall be unable to hold our own. "The greatest Russian soldier of modern days over and over again stated it as his opinion that Russia could both attack India by a direct attack and raise an insurrection behind our forces, and he was indeed good enough to leave us a description of the actual means to be taken to organize great masses of Turkoman cavalry, so as to cover the advance with a network of pillaging hordes. Since the death of Skobeleff, the Russians have advanced a vast distance on the road towards Herat, and they are now (as stated above) within easy striking distance of that city, and as their railways are being constructed, and the recently occupied districts becoming settled, the difficulties of transport are daily growing less." *

The Central Asian railway is admittedly a military railway and its construction is due to military considerations and none other, and to those who still hold that we have no cause to fear an eventual Russian attack upon India, we would ask, as Demosthenes asked the Athenians of old "do you for a moment imagine that these preparations are not directed against you ?"

There are some who advocate an understanding with Russia, and believe that Russia covets nothing which we possess. They argue that our position in India is indefensible unless with the full consent of the governed, and that if we possess the full consent of the governed, we need have no fear of a Russian invasion. Such people, however, display ignorance of facts, and of our duty to our own country, and also to the people of India, and it is not worth while to discuss the matter as an abstract question, when everyone must admit that the English people will not give up their hold upon India without fighting.

Besides the danger above alluded to, namely, a Russian attack upon India from without, there is also the danger of insurrection from

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* *The British Army* by the Author of *Greater Britain*, 1888, p. 88.

within on the part of the native population, whether it be the native army, the civil population, or the forces of the native states; and there is moreover a third possible contingency to be provided against, and that is an attack on our harbours by an enemy's fleet. It may be said that this last contingency is hardly worth considering, but it is not in reality so remote as many believe. It is generally argued that in the event of a war between Russia and England, we should have allies to aid us, but this is not the opinion of many able politicians, and in a paper written in 1878, by Lieutenant-General Von Henneken of the German army, on the probable course and result of a conflict between Russia and England, the writer gave it as his opinion that " in a war against Russia, England must rely on her own resources, to which, at the most those of Turkey may be added." At any rate it is quite certain that if the British empire is to be secure, its safety must rest on its own means of defence, and not on the possibility of getting allies at the last moment.

The only two European nations with whom our interests are opposed are Russia and France, the former finds herself opposed everywhere in Asia by English interests, and France cannot realize any of her colonial schemes without placing herself in direct antagonism to England. Their interests being thus the same, we must never lose sight of the possibility of an alliance being formed between the two, with the object of effecting our downfall, which would be an immense gain to both of them.

The danger of a war between England and France, as well as the still greater danger of war sooner or later, between Russia and Great Britain was clearly pointed out in the series of articles upon the " Present Position of European Politics," which appeared last year in the *Fortnightly Review*,* and in the event of war with France, it was pointed out that we should have to be prepared to defend our harbours and coaling stations all over the world, including those in Indian waters. The defences of these places are now happily receiving some attention, and when the works now in progress, are completed, our harbours will be in a better position to resist a hostile attack, but garrisons will have to be provided to man the works, and especially will our requirements in garrison artillery be largely increased.

It appears to have been assumed till quite recently, that our fleet was all that was required to protect our Indian shores, but there is little doubt, that in the present condition of our navy, it would be very unwise to trust solely to this protection. Should the French fleet combine with that of Russia, they might sever our communications with England, or at all events keep our fleet engaged in such a manner, that they would be able to attack our harbours and possibly land troops on the coast of India. The condition of the navy has lately been much before the public at home, and the opinion has been freely expressed that it is, at the present time, altogether inadequate to carry out the duties assigned to it. The proposition recently laid down by Her Majesty's Government was, that the British fleet should be more than a match for the combined fleets of any two European powers that were likely to be our foes; and that finding itself in such a contingency, its strength should be sufficient for defending our coasts and our commerce, and securing the punctual and certain delivery of our food supply against any two such powers. A high authority on naval matters, made a speech* in the House of Commons on the 13th of this month (December), to prove, that not only was our fleet not able, at the present time, to undertake efficiently the duties stated above, but that we were not in a position to defend ourselves successfully if engaged in a war with France single-handed!

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* *Fortnightly Review*, January to June, 1887, inclusive.

With regard to our Indian fleet, it is an open secret that it is quite unequal to the task of protecting our coasts and harbours. The flagship of the East Indian squadron is an unarmoured corvette of some 4,000 tons, carrying 7 inch muzzle loading guns, which would be perfectly useless against the fast armoured cruisers of the present day. Speed is the most important factor of modern naval warfare, and at present, as it has been emphatically stated, there is not a ship on the East Indian station "that could catch a porpoise." The weakness of the Indian fleet is of course well known to every European power, and a knowledge of the exact value of every vessel in the squadron is also possessed by them, and it is certain that in a war with Russia or France, advantage would promptly be taken of this weakness.

We have gone somewhat more in detail into this question than was intended, but the object has been to show that the idea of an attack on India from the sea is not so chimerical as is by many supposed.

We have thus considered three possible dangers to which

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* Speech of Lord Charles Beresford on the Navy Estimates in the House of Commons on the 13th December, 1888.

India is exposed, and it will be necessary to constantly bear these in mind when taking stock of our resources.

Duty of citizens in every nation to bear arms in defence of their country.

It is a recognised principle in every nation, that the duty of its citizens is to bear arms in the defence of their country. This principle was affirmed in England as far back as the reign of Edward I, in an Act* which obliged every man to have "in his house harness for to keep the peace after the antient assize," and every man was to be assessed and sworn to armour, according to the quantity of his lands and goods as laid down by the Act. The lowest property qualification was "twenty marks in goods" and the owner was to have "swords, knives and other less weapons".

The obligation of every citizen, to bear arms in the defence of the realm, is at the present day imposed by the law of England, but it has been allowed to fall into abeyance. Our military organization in England is now in such a chaotic state, and so lamentably defective as compared with our neighbours, that many think that the only possible remedy is a resort to conscription in some form or other. At the present time all the States of Europe, ourselves alone excepted, have adopted this form of military service, and have voluntarily taken upon themselves, the yoke of military discipline and restraint for some portion of their lives; and it is quite possible before many years are passed that compulsory service will have to be adopted in England. It is feared, however, that this is not possible in the present state of public opinion, and it will only be in the event of some great disaster, or some severe lesson, that a change in this respect is likely to occur. At any rate, such compulsory service would only be exacted for home defence, and would not directly affect the defence of our great dependencies. These in the event of the mother country being involved in war, would probably find that they were left to a great extent to shift for themselves, as it would be quite impossible for the fleet, and the comparatively small number of regular troops, which could be spared after the home defence had been provided for, to undertake the protection of the vast and scattered British possessions throughout the world.

Local defence in the Australian colonies.

In the Australian colonies, while fully trusting to the willingness of the mother country to aid them as far as possible, the necessity of providing for their own defence locally, has now been recognized. In the colony of New South Wales, for example, there were, at the beginning of 1887, enrolled in the naval and military service of the colony 7,120 men, consisting of 396 cavalry, 1202 artillery, 101 engineers, 165 members of torpedo corps, seven regiments of infantry of an aggregate strength of 4,506, and the naval brigade and naval artillery volunteers numbering 750 officers and men. The contingent sent to the Soudan in 1885, was selected from these forces. The other Australian colonies have also taken up the question of local defence, and considerable progress has been made in this direction.

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* Statute of Winchester A. D. 1285. See Clode's *Military Forces of the Crown* Vol. I, page 345.

Cape Colony and Natal.

For the defence of Cape Colony a military force is maintained known as the Cape Mounted Riflemen, numbering 818 officers and men. By a law passed in 1878 every able-bodied man in the colony, between 18 and 50, is subject to military service beyond, as well as within, the colonial limits. There was moreover in 1886 a body of 4,392 volunteers. The Cape Police, which consists of 38 officers and 752 men, is also available for defensive purposes in case of an emergency. In the colony of Natal, which since 1856 has been separate from Cape Colony, there is a body of mounted police numbering 183, and of volunteers 1,337, viz:—726 mounted riflemen, 438 infantry, 75 artillery and 98 naval defence corps.

Canada.

In Canada there is a large volunteer militia force. By the terms of the Act passed in March 1868, the militia consists of all male British subjects, between 18 and 60, who may be called out to serve in four classes, namely, 1st class, 18 to 30, unmarried; 2nd class 30 to 45 unmarried; 3rd class 18 to 45, married; and 4th class 45 to 60. The militia is divided into an active and reserve force. The active includes the volunteer and marine militia. The active militia are those who voluntarily enlist to serve in the same, or men balloted, or in part of both.* The marine militia is made up of persons whose usual occupation is on sailing or steam craft navigating the waters of the Dominion. The active militia serve for three years. The reserve consists of the whole of the men between the ages of 18 and 60, not serving in the active militia of the time being. On July 1st, 1886, the active militia consisted of 38,233 officers and men, comprising 43 troops of cavalry, 18 batteries of field artillery, 45 of garrison artillery, 3 companies of engineers and 651 companies of infantry and rifles. There are also 9 permanent corps and schools of instruction, the strength of which is limited to 1,000 men, viz:—one school of cavalry, three of artillery, four of infantry and one of mounted infantry. It is made a condition of service for the staff of the principal railways in Canada that they shall join the militia force. There is at present no active marine militia, the naval defences of the country being the care of the imperial authorities. The total number of the reserve militia was estimated at the beginning of the present year at 1,030,000. It will thus be seen that Canada has at her command a very powerful force for local defence, and we have here gone rather into detail concerning the organization of this force, to show what can be done in this direction, if the country itself is willing to undertake the burden and necessary sacrifices entailed by such an organization.

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* Up to the present no difficulty has been experienced in keeping up the proper strength of the force by volunteers, and no resort to the ballot is necessary.

Means at our disposal in India for local defence.

Europeans and Eurasians.

Turning now to India let us see what are the means at our disposal in the civil population for local defence. As already stated the European element in India is a mere handful compared to the millions of the native population. According to the *Census Report* of 1881, the total number of British-born and other European males in India was 106,412, the number of Eurasians being 31,283, that is to say there were 137,695 European and Eurasian males in India. Of these 55,931 were in the army and 2,966 in the civil service, and, of the remainder, 7,880 were below 20 and above 60 years of age. Thus there were some 71,000 European and Eurasian males in India. Assuming that these numbers are approximately the same at the present time as they were in 1881, and deducting the number of volunteers now enrolled, viz: 19,555 (see Appendix) there must be at least some 50,000 adult male Europeans and Eurasians, who if properly organized, could be utilized for the defence of the empire.

Native Christians.

In addition to these, there were in 1881, 800,000 native Christians in India, of whom it has been calculated 260,000 were physically fit for military service. Of this number five-sixths were in the Madras presidency. The consideration of the utilization for defensive purposes of the native Christians of this country is outside the scope of the present paper, which deals only with the European and Eurasian element. It may, however, be observed that the question is one of considerable importance and should not be lost sight of. It is generally said that the native Christians are wanting in the necessary physique and courage to become soldiers, but this is not borne out by facts, as at the present time there are a large number (more than 2,000) of this class serving in the Madras army, and there is little doubt that there is an unreasonable prejudice in the minds of many against native Christians as a body, they give the dog a bad name and will allow of no treatment but hanging. Moreover, as Sir Henry Lawrence once said, courage often goes by opinion, and many a man behaves as a hero or a coward according as he considers he is expected to behave. There ought then to be little difficulty in devising some means of utilizing this material which we have to hand, and in organizing them, so that they would be quite able, if necessary, to hold the whole of Southern India and to aid in the defence of posts and places of refuge. It must be remembered, that should a time of trouble again come in India, it will not be possible to throw off our responsibilities to this class. During the Mutiny of 1857, when some 200 native Christians of the village of Secundra claimed entrance to the fort at Agra, they were, to the shame of the British name it must be said, refused admission, and it was only by the noble conduct of a missionary, who threatened, if they were not admitted, to go out and share their fate, that the order was rescinded. This however could not happen again, and in devising any scheme for the organization of our European and Eurasian subjects, it would be necessary to make some provision for utilizing the services of native Christians, by forming them into separate militia or volunteer corps, or in some other way. Their loyalty is unquestioned and it would be sound policy to commence at once in times of peace, to train and arm them, so that when trouble comes, they may be able to render assistance and not be an incumbrance, for whose safety provision would have to be made.

Parsis and Goanese.

It may here also be mentioned that in addition to the native Christians, there are two other classes in India, of which it may be safely assumed that they would be loyal to us under all circumstances, their interests being so intimately bound up with the maintenance of the British rule. These are the Parsis and the Indo-Portuguese of Goa. It has been estimated that of the former, there are some 27,000 and of the latter about 18,000 capable of bearing arms, and in surveying our resources, it would be well to bear in mind that these numbers are available for defensive purposes, and if drilled and organized, they would be of the greatest value in garrisoning our arsenals and forts, thus setting free, for field purposes, a large body of regular troops.

The subject, however, of the organization of these classes, like the utilization of the native Christians, is beyond the scope of the present paper, and it is only touched on in passing to emphasize the fact that there are other materials, besides the European and Eurasian element, who can and ought to be utilized for the defence of the empire.

Duties required from troops forming the garrison of India.

Before entering upon the consideration of the organization of the European and Eurasian civil population, it will be well to make up our minds as to what are the essential duties, which, in the event of trouble arising, would be required of troops forming the garrison of India. In the first place it would be necessary that all centres of strategical, political and commercial importance, should be adequately held ; strategical and political centres, such as Allahabad, Lucknow, Lahore, Rawal Pindi, Multan, Mhow, Secunderabad &c., would require to be held in force ; and troops would have to be retained at such commercial centres as Calcutta, Bombay and Karachi. Arsenals and Government factories would have to be protected. Lines of communication would require to be held, and it would be necessary to employ troops to protect important railway centres, workshops, bridges &c., and also to garrison fortified posts or places of refuge. Not till all these requirements were provided for (and they would have to be largely supplied by Europeans) would it be possible to take away British troops to provide movable columns, or for the field army. The problem before us then, is to try and reduce to a minimum the number of regular European troops employed in garrisoning the points named above, and this brings us to the immediate subject of the present memorandum, which is the organization of European and Eurasian subjects in India (including volunteers) not belonging to the army or navy (i) as auxiliary to the British forces and (ii) for the protection of life and property locally, with a view to free as large a portion as possible of the regular army for service in the field.

Organization of the European and Eurasian element.

Number of men available.

It has been shown above, that there are at the present time some 71,000 Europeans and Eurasians in India, who are capable of bearing arms, of which number only 19,555 are enrolled in the volunteer force, thus leaving over 50,000, who if properly organized, would be of immense service in supplementing the regular troops, in maintaining order, and in aiding generally in the defence of the country. The problem before us is, therefore, how is it possible to organize these 50,000 men, so as to make them available to fulfil the *rôle* mentioned above?

As a preliminary to any scheme, it would be necessary to find out where these 50,000 men are, as it is impossible to make this out from the *Census Report*. It would therefore be necessary to take a fresh census of all the Europeans and Eurasians in the country, and the following information should be obtained of each male—age, usual residence, employment, whether in army, civil service or volunteers, and lastly whether physically fit to bear arms or not. Lieutenant-Colonel Rivett-Carnac in his memorandum on the subject of increasing the force of armed Europeans and Eurasians in India, written in 1884, proposed that registers should be prepared and kept up to date by every district officer in India, of all the Europeans, Eurasians and native Christians in his district, and this appears to be the simplest and the best plan, as it is of the utmost importance that the authorities both military and civil, should know, not only the numbers, but the places of residence of all those for whom accommodation might possibly have to be provided in fortified posts or places of refuge. When this information is collected it will probably be found that the majority of the Europeans and Eurasians are settled in the principal towns of India, such as Calcutta, Bombay, Karachi, Madras, Allahabad, Lahore, &c.

Formation of a militia.

Having discovered where the men are, we come to the consideration of the best system of utilizing their services for defensive purposes. Some of our best soldiers have held, and still hold that every able-bodied European and Eurasian in India should be enrolled in a militia, armed, trained, and bound to serve as a soldier in the defence of his usual place of residence, whenever called on by Government to do so. As long ago as 1872 Lieutenant E. H. H. Collen* advocated the establishment of a European and Eurasian militia in India, in a paper which subsequently appeared in the Journal of this Institution, and in 1879 a further memorandum on the same subject appeared in the Journal from the pen of Major H. Gray. These two papers treat the subject so fully, that it will not be necessary here to enter into the question, more than to say that the proposals seem both reasonable and necessary. These proposals may be stated, shortly, to be as follows :—(i) Obligatory universal militia service, for all non-military Europeans and Eurasians, capable of bearing arms. The first object would be the formation into organized bodies, of those physically fit whose interests and feelings are identical with the safety and supremacy of the British Government in India. (ii) The employment of these bodies should be for the garrison of fortresses at the capitals ; for the garrison of fortified posts at the various stations ; and for keeping open lines of communication. (iii) An Act should at once be passed making it compulsory on all male British subjects to serve for the defence of the empire and the Act should be applied to all Europeans, who, after the date of the Act, came to live in India. (iv) The Act should provide for an active force and a reserve. Major Gray proposed that the active force should consist of all those between the ages of 18 and 36, and the reserve of those froms 36 to 48, the only exceptions being efficient volunteers, men who have done three years military service and persons physically unfit.

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* Now Lieutenant-Colonel Collen, Secretary in the Military Department of the Government of India.

The arguments for and against raising such a force are so well known, that it is not necessary here to repeat them. There can be no doubt of the unpopularity of such a measure and the strong opposition which would be raised both in India and in England to its adoption, as everything in the shape of compulsion, is distasteful to Englishmen, even though they may approve of the object. In 1879, when the scheme came up before the Army Commission, it was negatived, and it may therefore be considered unnecessary, for the present at all events, to further discuss the measure, although we venture to think, that eventually the compulsory enrolment of all civilian Europeans and Eurasians in a militia, will be carried out in India.*

Failing the formation of an universal militia it is necessary to consider what are the next best means to be adopted. The plans which suggest themselves at once to the mind, are, either the raising of local corps of regulars or militia, by voluntary enlistment, or the development of the present volunteer system.

Raising of local corps of Europeans.

With regard to the first of these alternatives, the raising of local corps, it may be observed that the question was thoroughly gone into by the Parliamentary Commission of 1859, and it was decided that it was not desirable, on imperial grounds, to maintain a local European army for India. Previous to the Mutiny, the whole of the European artillery and nearly one-third of the European infantry, consisted of local troops, who were raised by the East India Company for service in this country, and who remained permanently in India. For these local troops, about 14,000 in number, regiments of the line and batteries of Royal Artillery were substituted after the Mutiny. Although there would be some saving in having a local force to supply the European troops, or at any rate a proportion of them, yet such a change would doubtless involve some deterioration in the efficiency of the army in this country, and would moreover deprive the British service of the valuable training which India now affords.*

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* Such a measure would require the sanction of a special Act of Parliament, and it is doubtful, in our opinion, if any Government in the present day would be prepared to face the question, except in the event of some serious crisis arising in India.

But although it is not desirable to return to the old system of a separate army for India, it is most necessary on every ground both of economy and efficiency, that some change should be made in the present short service system. Under the present arrangements, India is put to heavy expense on account of the passage home of time-expired men, and for bringing out recruits who have to take their places, and also on account of the frequent reliefs of regiments. Moreover the recruits that now come out to India being mere boys, easily succumb to the Indian climate. The young non-commissioned officers also, who are the product of the present system, compare unfavorably with the seasoned serjeants and corporals of former days, and it is hardly possible to avoid the conclusion that this has much to do with the crime of insubordination which seems so prevalent in the present day, However this may be, one thing is evident, and that is, that, India needs long service and England requires short service. and large reserves, and the system now in force, which was arrived at as a compromise, suits neither country.

A change, in the direction of long service for India, has been advocated by some of our ablest and most distinguished soldiers, who are however almost unanimously opposed to a separate local army. Lord Wolseley advocates an eight years service for India, and a home service chiefly of three years, while the present Commander-in-Chief in India would engage men for a foreign service of twelve years, and for a home service chiefly of three years, and would divide the forces of the Crown into two great divisions, a foreign service army and a home service army. Lord Wolseley objects to the longer term of twelve years advocated by Sir

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* It may be noted that the Government of India has not now the power of raising men for local service in India, and a special Act of Parliament would be necessary to grant this power.

Frederick Roberts, on the ground that the health of the men would deteriorate after a service of eight years in India. There can be very little doubt in the mind of any one who has considered the subject, that short service is quite unsuited to Indian conditions, and the attempt to apply the same terms of service to conditions so different has proved a complete failure.

Raising local corps of Eurasians.

The subject of raising local corps of Eurasians is however a different matter from local European regiments. The Eurasian class deserves every consideration from the State, and if it were found possible to employ them as soldiers for the defence of the empire, it would be advantageous both from a political and from a military point of view. Formerly there were three corps recruited from this class, viz:—

Eurasian Artillery (garrison), raised October 1858,
disbanded 1870.
Lahore Light Horse, raised September 1857,
disbanded 1865.
East Indian Regiment, raised September 1858,
disbanded 1864.

The reasons given at the time for the disbandment of these regiments were, that they were almost as expensive as British corps, while not nearly as efficient, that sufficient eligible recruits were not available, and that the enforcement of discipline in these corps was of doubtful legality. The first objection applies more to the particular corps which had been disbanded, in which Europeans and Eurasians were mixed. This was a mistake, as such regiments to be worked economically, must be composed of the Eurasian class only; if Europeans are also admitted, the whole regiment would have to be treated as Europeans. The second objection may be met by the statement, that the formation of Eurasian corps would only be supplementary to the existing establishment of British troops in this country, and not as substitutes for the latter. With regard to the third objection, it may be observed that the number of this class in India has considerably increased during the past twenty-four years; and the last objection might be overcome by special legislation.

As already stated the Eurasian class deserves every consideration from the State, and we are bound by every moral and political motive to assist them. They have moreover certain special qualifications not possessed by British soldiers, for instance, they are able to stand the climate better and suffer less from the diseases peculiar to India, they could be employed in places unsuited to Europeans, and they know the language of the country as well as English. Their nationality and religion, would guarantee their fidelity, which was proved over and over again during the Mutiny. In the 1st Madras Fusiliers, which did such gallant service during those troublous times, more than one-third of the men in the ranks were born and bred in this country.

It has often been said that the *Army Regulations of India* distinctly allow men of the class we are considering to enlist into the British service, but any one who knows anything about the subject is aware that the paragraph referred to* is practically a dead letter, as commanding officers do not care to enlist these men into their regiments.

It is also said that the volunteer force affords an opening to the martial spirits among our Eurasian subjects. But it is only the well-to-do and better class, who for the sake of social advantages or for other reasons, join the volunteers, the poorer portion of the community, whom it should be the special object of Government to assist, not being able to afford to join an organization in which they would not receive pay.

When, however, all has been said that can be said on behalf of the proposal to form separate corps of Eurasians, and however desirable the scheme may appear in the abstract, it will be found that the practical difficulties to be met with are almost insuperable, the great objection being the cost of the scheme and in addition to this there is the false pride which is inherent in the race, and which defeats every attempt to help them by insisting on impossible conditions.

The above remarks apply to the scheme for the formation of *regular* regiments of this class. It has also been proposed to form *militia* corps, and here the difficulties seem to be considerably less, and although the experiment has not yet been tried, it would seem to offer a good chance of success, if the corps were properly organized. It has been suggested that when the harbour defence works, now in progress, are completed, a considerable increase in the strength of the garrison artillery in India will be necessary,† and that to supply a portion of

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* A. R. I, 1886, Volume II. para. 2184.

† On the 1st October last the Army List showed that there were 23 batteries of garrison artillery then in India, distributed as follows :—

	No. of batteries.
Fort William	1
Barrackpore	1
Allahabad	1
Agra	1
Delhi	1
Camp Kailana	1
Carried forward	6

defensive purposes, and if drilled and organized, they would be of the greatest value in garrisoning our arsenals and forts, thus setting free, for field purposes, a large body of regular troops.

The subject, however, of the organization of these classes, like the utilization of the native Christians, is beyond the scope of the present paper, and it is only touched on in passing to emphasize the fact that there are other materials, besides the European and Eurasian element, who can and ought to be utilized for the defence of the empire.

Duties required from troops forming the garrison of India.

Before entering upon the consideration of the organization of the European and Eurasian civil population, it will be well to make up our minds as to what are the essential duties, which, in the event of trouble arising, would be required of troops forming the garrison of India. In the first place it would be necessary that all centres of strategical, political and commercial importance, should be adequately held ; strategical and political centres, such as Allahabad, Lucknow, Lahore, Rawal Pindi, Multan, Mhow, Secunderabad &c., would require to be held in force ; and troops would have to be retained at such commercial centres as Calcutta, Bombay and Karachi. Arsenals and Government factories would have to be protected. Lines of communication would require to be held, and it would be necessary to employ troops to protect important railway centres, workshops, bridges &c., and also to garrison fortified posts or places of refuge. Not till all these requirements were provided for (and they would have to be largely supplied by Europeans) would it be possible to take away British troops to provide movable columns, or for the field army. The problem before us then, is to try and reduce to a minimum the number of regular European troops employed in garrisoning the points named above, and this brings us to the immediate subject of the present memorandum, which is the organization of European and Eurasian subjects in India (including volunteers) not belonging to the army or navy (i) as auxiliary to the British forces and (ii) for the protection of life and property locally, with a view to free as large a portion as possible of the regular army for service in the field.

Organization of the European and Eurasian element.

Number of men available.

It has been shown above, that there are at the present time some 71,000 Europeans and Eurasians in India, who are capable of bearing arms, of which number only 19,555 are enrolled in the volunteer a standing army. The Honorable Artillery Company[*] was the first volunteer corps raised in England, having been granted a patent of incorporation by Henry VIII in 1537.

On several occasions, in times of national emergency, have the English people replied nobly to the calls of the country, and come forward as volunteers for the defence of the realm. In 1798 when the national independence was threatened by a foreign invasion, 150,000 came forward in arms in a few weeks. Again in 1803, when Napoleon was collecting his legions at Boulogne, with the ostensible purpose of invading England, in response to the appeal of patriotism, the volunteers again came forward with the utmost readiness. The volunteer returns, up to the 9th December, 1803, give 380,000 for Great Britain and 82,941 for Ireland, as the numbers of the force. For the next few years the returns continue to show a considerable strength of volunteers maintained in the country, but after the battle of Waterloo, the force dwindled down to very small proportions, and it was not until 1859, that a fresh impetus was given to the movement, and the numbers since then, have, in spite of many difficulties and obstructions, continued steadily to increase, until the volunteer corps in Great Britian now number 228,038 of which 221,491 are returned as efficient[†].

Turning now to India, we find that considerable progress has been made in this country during the last thirty years in the volunteer movement. The oldest of the existing volunteer corps, (the Madras Volunteer Guards) was raised on the 2nd July 1857, during the Mutiny. Fresh corps were subsequently added and the strength of the force gradually increased, until at the present time there are in India, 8 corps of volunteer cavalry, 6 of volunteer artillery, 9 of volunteer mounted infantry, and 53 of volunteer rifles (excluding one of reserves). The enrolled strength of these volunteer corps is 19,555, and of these 15,908 are efficient (see Appendix). This shows a marked improvement during the last few years, as five years ago the enrolled strength of the

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[*] The affairs of this ancient corps have recently been before the public. Last month owing to the unsatisfactory state of discipline in the regiment, it was found necessary to disarm them, and the reorganization of the corps on a more satisfactory basis is now under official consideration.

[†] These numbers are taken from the *Annual Return of the Volunteer Corps of Great Britain for 1887* presented to both Houses of Parliament. The total of 228,038 is made up as follows :—

Light Horse	239
Artillery	42,196
Engineers	10,494
Submarine Miners	607
Mounted Rifles	57
Rifles	173,695
Medical Staff Corps	750
Total	228,038

force was only some 12,000, of which number about 9,400 were efficient. However there is much yet to be desired, there are, as has already been shown, still 50,000 Europeans and Eurasians who have not joined the volunteer force, and whose services for the defence of the empire are lost to the country.

Among these 50,000 are to be found members of the civil service, of the public works, forest and telegraph departments, together with members of the bar, *employés* of factories, and those connected with various business occupations in private life. From the point of view of what constitutes a good volunteer, namely, intelligence, self-reliance, and physique, these classes contain perhaps the very best material in the country, accustomed, as many of their members are, to positions of control, or following avocations calling for the exercise, not of intelligence only, but also of physical endurance ; whilst many of them have a taste for field sports and the rifle. For various reasons, the ordinary duties of the volunteer, entailing attendance at a compulsory number of drills and an elaborate musketry course, to ensure a capitation grant, have no attractions for these men. They have no occasion to join the force for the sake of society or occupation ; many of them have really not the leisure to attend the prescribed number of drills ; the prizes offered for shooting are no inducement to them ; and many do not see the necessity of marching up and down a dusty parade ground burdened with an uniform and a rifle.

Scheme for a volunteer reserve force.

To remedy this, and to secure this valuable material, at present lying waste, for defensive purposes and also to prevent confusion when trouble arises, Lieutenant-Colonel J. H. Rivett-Carnac, commanding the Ghazipur Volunteer Rifle Corps, proposed a scheme in 1884, the main object of which was to attach to the existing volunteer organization, all classes of Europeans and East Indians, and to extend the volunteer system, by enrolling in a second line as a reserve, such persons as are for various reasons unable to go through the regular discipline of a volunteer corps. The main arguments used in favor of this scheme were, that only a small proportion of the total adult European and Eurasian population in India, capable of bearing arms had joined the volunteer force ; that many more of these should be in a position, in case of emergency to come forward in arms, and that every addition to the armed strength of the country, which can be made from their number, without diminishing the regular volunteer force, and by enlisting the help of men who would not at present become volunteers, is so much gain which it is well worth while to secure. No doubt on the occasion of any trouble arising, numbers of men would join the volunteers, who in times of peace are deterred from joining by hard work, the conditions of the climate, the distance from volunteer centres and other similar circumstances; and the additions to the force thus gained would, with a little training, become efficient and very valuable. But, under the present arrangements, the Government would not know, till inconveniently late, the number of men available or where they were; and the arms and ammunition of those who would wish to join the ranks in a time of emergency, would either not be available in the country, or would not be at the points where and when most required, while arms and ammunition in private hands would not be of a uniform description.

The proposals made by Lieutenant-Colonel Rivett-Carnac were briefly as follows:—that when in a district all possible measures had been taken to induce men to join the volunteers, an attempt should then, and not till then, be made to enrol the balance in the second line or reserve, and for these a supply of arms and ammunition would be provided at all stations and they would be armed and taught to use their rifles. With this view it was recommended that lists should be prepared in all districts, showing the number of men available, the number who were already volunteers, and the number who would join the proposed reserve. The importance of enlisting the interest and assistance of the civil authorities in the matter was also urged. Although the possibility of some of those, who were already members of volunteer corps, joining the reserve was not overlooked, it was held that the class of men who are now volunteers, and the circumstances connected with their enrolment, would preclude any sensible drain on the existing organization; and that well considered precautions and conditions would further tend to minimise any such apprehended loss. Further that by increasing the privileges and advantages of active volunteers as compared with the reservists, a line of demarcation would be drawn between the two bodies, over which few volunteers would retreat into the reserve, whilst on the other hand there would be some hope of reservists being by degrees attracted over the line to the volunteer corps.

Lieutenant-Colonel Rivett-Carnac did not claim for the scheme that it was any more than a *pis-aller* rendered necessary by the acknowledged difficulty of getting men in India to join the regular volunteer force. The chief merit claimed for it was that, in the face of this practical impossibility of inducing all to become efficient volunteers, the scheme provided a rifle and ammunition, ready to hand, for every adult, and admitted of some organization, and also supplied information in each district of the number of men available in an emergency.

Such being the arguments for the scheme, and such being the proposals put forward, it is not necessary to notice more than one or two of the principal objections which were raised against it. It was said that there was no good in having a number of men on paper, and that an undisciplined body of armed men would be worse than useless and would be only a dangerous mob. On these points it will be sufficient to quote the opinion of the late General Sir Herbert Macpherson, who, when consulted by Lieutenant-Colonel Rivett-Carnac, observed that it was some gain at all events to have the men on paper. "We have not" he pointed out "got them even on paper yet, and it would be something to know where they are, and how many could be got." Undisciplined Europeans and Eurasians he thought would certainly be dangerous to the disaffected, and a number of them could be made, by a good soldier, in a very short time into a satisfactory body for ordinary defensive purposes. In this connexion and as an instance of the value of troops with but little training or discipline, may be quoted the case of the Franc-Tireurs, who were employed largely in France in the war of 1870, and did much real work. They harassed the Prussian advance, kept in check the enemy's cavalry, and when employed in fortified places did excellent service. The siege of Belfort is a good example of the value of such bodies. They defended the villages round that fortress, converting them into strong posts, and compelled the Germans to attack each village almost as if it were a separate detached work. Wanting ammunition they cast their own shells and made their own cartridges, and kept Belfort in French hands until the close of the war. Another and more serious objection urged against the scheme, which had been pointed out by Lieutenant-Colonel Rivett-Carnac himself, was that the proposed measure might deplete, to some extent, the ranks of the regular volunteer force. This objection will be noticed again further on.

The scheme was sanctioned in principle for the North-Western Provinces and Oude, by the Government of India in 1885. Since then a volunteer reserve has been sanctioned for Burma, and the formation of similar bodies in Bengal, Bombay and Calcutta and also in connexion with Indian railways, was approved in May 1887. Although the scheme was sanctioned as long ago as 1885, from various causes the movement has up to the present made comparatively little progress, and the interest which was at first excited, was unfortunately allowed to subside. In the Army List for the 1st October 1888, the total number of reserves shown is only 330, all of whom belong to the Presidency Volunteer Reserve Battalion. Recently, however, there has been a renewed interest shown in the matter, and it is of the utmost importance that this should be maintained, and every effort made, not only to extend the movement to all the provinces of the Indian empire, but to rouse in the mind of every civilian, whether European or Eurasian, official or non-official, the necessity of using his utmost endeavours, even at some personal sacrifice, to further the object in view, which is so intimately associated with the security of the empire.

On the 20th October last, a resolution by the Government of the North-Western Provinces and Oude, appeared in the provincial gazette, on the subject of the formation of a volunteer reserve, in which the conditions sanctioned by the Government of India were enumerated. These conditions were—

(1) that the force be called "the volunteer reserve";

(2) that it be armed with the Martini-Henry rifle, 50 rounds of ammunition per annum being issued *gratis* to each member of the reserve;

(3) that the reservists keep the rifles themselves, except in cases where safety requires otherwise;

(4) that a capitation grant of Rs. 10 will be given for any man who passes as efficient in musketry;

(5) that the wearing of uniform will not be compulsory, but a sum of Rs. 5 will be granted to every reservist providing himself with uniform, on the same terms as regular volunteers;

(6) that all that should be required from each member be that he should be able to load his weapon, shoot fairly straight at a moderate distance from an easy target, clean the rifle after its use, and take care of it when not in use;

(7) that the test for efficiency (passing which will qualify a reserve volunteer for the capitation grant) be as follows:—

Yards.	*Rounds.*	*Target.*	*Hits.*
100	5 standing	4 feet	3
200	5 kneeling	4 „	3
300	5 lying down	4 „	3

(8) that the question of qualification should be left very much in the hands of commandants, who would furnish a certificate (with prescribed particulars) for presentation to the pay office; and

(9) that the nearest volunteer serjeant or other qualified

instructor should be sent to teach those in want of instruction; and the practice or test shooting should be done somewhere near the reservist's home, the instructor seeing that the distance and size of the targets are correct.

In order to guard against the danger, already noticed, of the regular volunteer force being depleted by the formation of the reserve, rules were sanctioned in April last for Burma, which appear to prevent the possibility of such a contingency. These rules, which should be universally adopted, are—

(1) that persons will be enrolled as honorary volunteers* through the agency of commanding officers and volunteer adjutants, deputy commissioners being requested to instruct persons desirous of joining the reserve to apply to the commanding officer and adjutant of the corps to which their district is affiliated;

(2) that commanding officers and adjutants shall be at liberty to refuse admission to the reserve, in the case of applicants who do not appear to be prevented from joining a corps as active volunteers by reason of either (i) their age, (ii) their business, or (iii) the remoteness of their place of residence from volunteer centres.

These rules would be applicable alike to men not yet enrolled, and to volunteers already serving in that capacity, who would not be permitted to join the reserve except with the consent of the commanding officer.

For the success of the scheme, it is of the utmost importance that the civil officers and especially the district officers, should take a real interest in the movement. We hold that every civil officer in the country ought to be' competent to command a body of armed men, as it is impossible to say when he may be called on to exercise such command. The writer remembers an instance where a district officer on the frontier was called on in an emergency to take command of a body of police. Under such circumstances even a very slight knowledge of drill would have been of the greatest use. A common plea urged by civil officers is that pressure of work does not allow them time to join the volunteer movement, to which it may be replied that this latter is a duty which is one of the first importance, and should be considered as much part of their work, as any other of the duties they are called on to perform. All civil officers, entering Government service hereafter, should therefore without exception, be required to join the reserve, unless they belong to an active volunteer corps.

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* This is the designation now proposed by Lieutenant-Colonel Rivett-Carnac but the title of reservists seems more suitable.

The custody of arms is another point of importance. The scheme provides that these shall be issued to reservists "except in cases where safety requires otherwise," but before the arms are given out full subsidiary orders should be issued as to the responsibility for their cleanliness, and for the safety of them and the ammunition. At the present time the custody of the arms is a constant source of anxiety to volunteer officers and in spite of precautions, rifles are sometimes damaged, and even lost, and it is not an uncommon thing for a volunteer to leave the station, without returning his arms to store. If these difficulties are experienced in a properly organized corps, some very stringent rules will have to be framed for the safe custody and proper care of the rifles distributed to the reservists in small out-stations.

Before leaving the subject of the reserve a few general remarks may be offered on the scheme proposed, which is one that must commend itself to every one who has at heart the interests of the British empire in India, and the safety of the European and Eurasian community. In the first place it would be advisable for the Government to frame a general set of rules for guidance in the formation of such reserves, as uniformity of procedure is desirable, these could be modified to suit local requirements. The reserve might consist of two classes, those who have been in the regular service, or have been efficient volunteers, and those who have had no previous training in the use of the rifle. The latter before having arms issued to them should be required to go through some elementary drill, in addition to instruction in the handling of the rifle, to enable them to qualify in the efficiency test laid down for shooting. A proposal has also been made that all reservists should be required to attend two drills a year, and such other parades as may be ordered by the commandant, besides going through the annual course of musketry. These requirements do not appear excessive, and it seems that two drills a year are not too much to expect of efficients in the volunteer reserve.

The proposed scheme, it will be seen, is applicable especially to the infantry branch of the service, as of course no reservist would be of use as an artilleryman, for instance, unless he had gone through some previous training in the working of guns, but men who had served in the volunteer or other artillery, and are unable for any reason to be active numbers of the volunteer corps might become artillery reservists, and thus their services would not be wholly lost to the State.

There are a certain number of men, fortunately not many, whose characters, antecedents, or habits would not make them useful members of the force, and these men should not be enrolled, as it would be neither wise nor safe to entrust them with arms and ammunition unless under stricter regulations than those now proposed.

Lastly, if every district officer did his best, there ought to be no difficulty, after enrolling as many as possible of the adult European and Eurasian population in the first line, to enrol the remainder in the second or reserve, and if the scheme be properly worked out, there will be no excuse for any able-bodied man of these classes not joining either an active volunteer corps, or the volunteer reserve, and thus an approximation would be arrived at, to the more complete organization, which can only be secured by compulsory service in a universal militia for the whole of India. There will no doubt be practical difficulties raised to the working of the scheme, but these it will be possible to overcome, and, to quote the words of the Duke of Wellington, in a speech in the House of Lords in 1852, when supporting the Militia Bill which provided for raising an additional force of 80,000 men for home defence—"it will not be at first or for some time, everything we could desire, but by degrees it will become what you want, an efficient auxiliary force to the regular army."

Necessity of further development of the volunteer system.

With regard to the development generally of the volunteer system in this country, it is proposed to offer some few remarks, although the subject was treated very fully in the valuable paper on the "Present and Future of the Volunteer Force in India" by Major Collen, which gained the Gold Medal of this Institution in 1883. In that paper the writer shows the value of the volunteer movement, and the necessity of its further development in India, both for the peace and also for the security of the country, and he shows how the formation of volunteer corps at those places where there are European residents, would, in time of trouble set free a large number of British troops for service in the field. He then investigates the classes from which the volunteers are drawn and the measures necessary to increase their numbers and efficiency, and the conclusion he draws is that it is better to increase the numbers rather than the efficiency of the volunteers, but that measures for improving the condition of the force will effect both objects. Major Collen next discusses various improvements in the organization of the volunteer force, and points out the desirability of having one officer at the head, as Inspector General, the necessity of organizing all corps in administrative battalions, and in conclusion he offers some remarks on the drill and training, the appointment of officers, and the uniform, arms and equipment of the volunteers.

It is not proposed to go over the ground here traversed, any one who wishes to get a further knowledge of the subject, is advised to read for himself this excellent essay. The question of having one officer at the head of the volunteer force mentioned by Major Collen, has been often urged, and until this is done, the volunteer force in this country will remain in its present unsatisfactory condition. Whether the officer is called "Inspector-General" or "Deputy Adjutant-General for Auxiliary Forces," as in England, matters little, all that is required is that he should be an officer of experience and influence, who will take a real interest in the volunteer movement, further its interests in every way, and introduce uniformity into the organization, instruction, and equipment of the force. It is high time that the volunteers in this country should assume the same position as a factor in the defence of the empire as that held by the volunteers in England. The peculiarity of the home organization is the remarkable persistence which it has shown through years of discouragement, and in face of difficulties of all kinds, some of them made by the Government, and the permanent character which it has now assumed, as a powerful element in the defence of the mother-country. In India volunteering is now very much in the position which it held in England some twenty years ago, when to become a volunteer entailed some little ridicule on the part of friends. The sooner the feeling changes in this country, as it has done in England, the better it will be for the security of the country.

While agreeing generally to all the proposals put forward in Major Collen's paper, there is one point, on which we are at issue with him, namely, the question of making the appointments of men to the public service conditional on their becoming volunteers. Major Collen says—"such a measure would strike at the root of volunteering. Government does not pay for the services of its *employés* as soldiers, and there is no reason why one particular portion of the community should be taxed in service for the benefit of the remainder." With all due deference to such authority, we hold that the Government has a perfect right to make such a condition for appointment to its service. There is not the slightest injustice in such a step, as of course the rule, if brought in, would have no retrospective effect, and the candidate for an appointment would be free to refuse to serve under these terms. Moreover, if the Government enforced such a measure with regard to its servants, it is highly probable that private companies and firms, such as banks, railways, houses of business, &c., recognizing the necessity of the movement, would follow suit and bring pressure to bear on their *employés* to become volunteers, or at any rate to join the reserve. As already stated many of the best soldiers at the present day are of opinion that the proper means to adopt for the defence of the empire, would be to enrol every European and Eurasian capable of bearing arms in a militia, but failing this we maintain that the Government has a right to demand from its own servants, a liability to learn the use of arms, so as to be in a position to aid in the defence of the country.

It is therefore considered that the following rules should be made applicable to every servant of Government, whether European or Eurasian, (i) that all eligible persons who may hereafter enter Government service, shall become active members of a volunteer corps, and shall remain so until drafted into the reserve or exempted from future service by proper authority; (ii) that all volunteers who have qualified five times as efficients and have attained the age of 35 years, may, if they so desire it, be drafted into the reserve; and (iii) that such persons as from the distance they live away from the volunteer headquarters, or for other reasons, may be allowed by commanding officers, as special cases, to join the reserve.

Suggestions for further improvements.

It is now proposed to offer a few suggestions for the further improvement of the existing volunteer force, which have not been mentioned in Major Collen's paper or if mentioned have only been cursorily alluded to. In the first place with regard to drill, it is quite useless to expect the volunteer, with his limited training, to attain to the same degree of proficiency as the regular soldier, in fact it is not necessary even if it were possible. The standard of efficiency required is laid down in the A. R. I, 1886, Vol. IX, para. 345, as follows—"a fair knowledge of simple manœuvres with a thorough practical efficiency in the use of the rifle, should therefore be the first *desideratum* in the training of every volunteer. That once accomplised, a more extended knowledge, as opportunity is given, can be rapidly acquired." These qualifications combined with a ready intelligence and ability to act independently are all that are necessary to make a good volunteer. It is of far more importance for volunteers to be good skirmishers than to waste time in trying to acquire the exactitude of movements of the regular army—movements with their obsolete exactness and dressing upon points, which call to mind the times of Frederick the Great, and which for modern warfare are,

Drill.

as some believe, "as useless and objectless now as would be the hand grenade drill or the management and handling of the pike to which our ancestors attached so much importance in the reigns of the Stuarts."

Discipline.

Next, with regard to discipline, there is at present no means of punishing a volunteer short of trying him by court-martial, and this is certainly a weak point in the system. By Act XX of 1869 a member of a corps of volunteers may be fined or dismissed from the corps, but only by sentence of court-martial, and even for minor offences a fine can only be imposed by a regimental court-martial. A proposal has been put forward to abolish these last altogether, and to delegate the powers granted to them under the Act above quoted, to commanding officers, subject to appeal to the local government should a fine be imposed exceeding Rs. 16 or Rs. 20. This suggestion appears sound, and should be adopted. It has also been proposed that those whose names in the opinion of the commanding officer it is desirable, in the interests of the corps to strike off the rolls, should be published in the local government gazette. This suggestion also appears worthy of consideration. Under the present system, commanding officers have no power whatever, and the maintenance of proper discipline is next to impossible; a volunteer if reprimanded for negligence or other offence has the power under the Act to demand the acceptance of his resignation within seven days. It is obvious that some measures are necessary to strengthen the hands of commanding officers.

Uniform.

As to uniform, for all corps in India this should be of one universal pattern, facings and badges of corps only being different, and should be obtainable on indent from the army clothing department, the cost being deducted each year from the capitation grant of the corps. This would be a great saving of trouble and of expense. In India, where volunteers are constantly being transferred from one station to another, it is essential that they should not have, at every change, to get new uniform. The expense falls especially heavy on officers, who have always to provide their own uniforms, the result being that in many cases, an officer, when transferred to another station, rather then go to the expense of buying a new uniform, ceases to be a volunteer. This result would be obviated if the uniform of all corps was assimilated, and it was only necessary, when transferred, to have the facings and badges altered. At the present time in the Bengal presidency alone, there are no less than ten different colours of uniform, *khaki* being the one most generally adopted. The great point is that the uniforms should be simple and cheap, so that service in the volunteers may in no case impose unnecessary expense on the less wealthy members of the corps, who can ill afford it. The universal colour for all uniforms might perhaps be *khaki*, the material being drill in the plains and serge in the hills, and the coat might be made after the pattern of the field service coat of the regular army, as for many reasons it is desirable that there should be no marked difference between the uniform of the regulars and that of the volunteers. Every man should on enrolment be supplied with a pair of English ammunition boots, free of cost, and should subsequently be allowed to purchase these boots at the same price that they are sold to the British soldier. If the volunteers are to be able to march any distance, they must be properly shod, which at present is not the case.

Provision of well considered encouragements.

The most important matter, however, in connexion with the popularity, and consequent increase, of the volunteer force is the provision of well considered encouragements to those who render themselves efficient. Major Collen has enumerated some of the advantages and inducements which might be offered to those who are efficient volunteers, but in addition to those advocated by him, still further encouragements might be provided. For instance concessions might be granted to all efficient volunteers travelling by rail whether *on duty or on private affairs*, and they might be allowed to travel first-class in the case of officers and second class in the case of others, at the rate charged for the class below. Again, arrangements might be made by the Government with the large shipping companies for efficient volunteers to travel by sea under favorable conditions. Similar exemptions as regards income tax to those enjoyed by the regular army might also be granted. With reference to Government officials it has been suggested that one month's additional service might be allowed to reckon towards pension or gratuity ordinarily admissible under existing rules, for every year's volunteer service, and also that casual leave might be granted to volunteers at out-stations to go through their annual musketry training, and attendance at parades facilitated, as far as possible, by all heads of offices. For the officers it has been proposed that they should be allowed to accumulate an additional week of privilege leave each year, and also that they should be eligible for rewards and distinctions as in the regular army. State aid towards the education of children of deserving volunteers has also been advocated. These suggestions are not put forward as new, but they are here again urged, as it will probably be found that the best and most practical way of making volunteering popular in this country is by granting these and similar privileges, to those who undertake the personal sacrifices entailed in rendering themselves efficient. These concessions would affect different classes unequally, and the only practical way will be to treat each class separately and to offer to each such privileges as would be most acceptable and most valued. The great point to be insisted on is, that the Government should in these matters treat the volunteers in a liberal spirit, and although it will probably be objected that to do this will involve considerable expense, and that the privileges and concessions advocated will cost money, we can only reply *qui veut la fin veut les moyens*; if it is worth while having a volunteer force at all, it is worth while making it efficient, and the increase to the trained and serviceable body of active volunteers, would amply repay the expenditure which might be incurred. In the Madras presidency especially, a large proportion of the volunteers are drawn from the poorer classes of Eurasians, to whom concessions, however small, would serve as an inducement to make many, who have not joined the movement, decide to come forward. It may be objected that this is contrary to the spirit of volunteering, but any who hold this view would be at liberty to decline to take advantage of the privileges and concessions granted.

It is not proposed that men of the volunteer reserve should enjoy any of the advantages sketched above, these would be confined exclusively to efficient volunteers, and this might, in some cases, serve to induce men of the reserve to join the active corps and make themselves efficient.

Importance of civil officers joining the volunteer movement.

The importance of all civil officers joining heartily in the volunteer movement has already been pointed out when speaking of the reserve. It is most desirable on every ground, that all heads of departments, and civil officers, should themselves join the active volunteer force, both for the sake of example, and also because they are naturally the proper men to supply the much needed officer element in the force. If this were done, success would be assured, but without active support from those in power the volunteer movement cannot be placed on a satisfactory footing.

Officers.

With regard to the officers of the volunteer force there is no doubt much to be desired. The almost universal consensus of opinion among those who are or have been adjutants of volunteer corps is that the officers do not, as a rule, take sufficient interest in their duties. Too much care cannot be bestowed upon the selection of the officers, as on them the efficiency of the corps mainly depends. These are, under the present system, chosen by the members of the regiment, but it is doubtful whether in practice the best men are selected in this way. What is required is not only that the officers should be of good social position, and have influence with the men, but that they should take a keen interest in the drill and efficiency of the corps generally. This class of officers is at present, speaking generally, not obtained, and it has been suggested that the efficiency of corps in this respect would be improved, if the appointment of the officers rested more with the commandant, or if it is not thought desirable to alter the present system of selection, that at any rate, the names of candidates should be submitted to the commanding officer for approval and that the promotion of officers should be left entirely in his hands, as he is the most interested in having good men under him. Further inducements might be held out to officers of volunteers to qualify themselves in professional subjects, and the rule which requires an officer, who has failed twice to pass the examination laid down in the regulations, to resign his commission should be strictly enforced.* The difficulty of getting properly qualified officers for the volunteer force is also being experienced at home, and the subject is just now prominently before the public in England. Both the militia and volunteers at home are notoriously deficient in officers both as regards quantity and quality.

In a German work recently translated into English,† there occur some weighty passages with regard to officers. The writer quotes the saying of Ruchel "the soul of the Prussian army is in its officers" and then goes on to point out what are the qualifications required in every officer. He mentions the Turks of the present day as an instance of the lot in store for an army composed of excellent material but under the leadership of inefficient officers. The best possible troops under bad leaders can never be of much value.

For the volunteers it is of vital importance that the officers should be efficient, and know their duties thoroughly. It is an axiom among military men, that the weaker and less trained your rank and file are, if you want these men to hold their own and to be well disciplined in the field, the stronger must be your corps of officers. Never was this more clearly shown than during the war of 1870, when hundreds and thousands of brave Frenchmen were put into the field ready to fight to the last, but with the trained officer element wanting.

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* The restriction against warrant officers holding commissions in the volunteers might be withdrawn.

† *The Nation in Arms* translated from the German of Lieutenant-Colonel Baron von der Goltz by Philip A. Ashworth, 1887. An excellent work spoilt by the translator.

Provision of places of refuge.

Intimately connected with the subject of the extension of the volunteer movement, in fact one may be considered the complement of the other, is the provision of places of refuge at every station or centre where there is any considerable number of European residents. Before the Mutiny of 1857, Sir Henry Lawrence advocated the construction of a redoubt in every cantonment in India, and if this had been done how many valuable lives would have been saved! After the Mutiny it was considered almost a settled point that such security was to be provided, and the subject has been since taken up more than once, but as far as we are aware it has not received much encouragement from the Government. There can be no shadow of a doubt that some provision of the kind is of the utmost importance and would we believe go further than almost anything else in deciding the civil European and Eurasian population to join the volunteer movement. It is only possible here, from the very nature of the subject, to touch upon it, the details should all be worked out without exciting public attention more than necessary, and the volunteers should be instructed how the places selected would have to be defended. Plans should be prepared beforehand of the work necessary to be carried out on the occurrence of an outbreak. In selecting the site, particular attention should be paid to the water supply, which should not only be ample but should be under command of the fire of the garrison, and the post should be large enough to hold all the non-combatants, and also easily defensible against an enemy unprovided with artillery. Supplies of food, ammunition, spare arms, disinfectants &c., for at least three months, and also of the necessary tools for putting the place into a state of defence should be stored beforehand. If, however, this is not considered advisable, arrangements should be made for the post being easily provisioned and supplied when necessary, but the former plan would be preferable, as in the event of it being necessary to occupy the place at short notice, there might (and probably would) be difficulty in procuring the necessary supplies and implements. Arrangements should also be made beforehand for calling in, when necessary, all the Europeans and others, for whom protection would be required, from the outstations to the place of rendezvous. Such defensible places of refuge could easily be held by volunteers, thus setting free the regular troops for service in the field.

Duties of volunteers in case of trouble.

It is of great importance that all volunteers should know exactly what their functions would be in case of trouble. What portion of them would occupy fortified posts and places of refuge, what portion of them would be required to protect cantonments at strategical centres, to set free the regular troops, and what portion of them would be used as field troops. The home ties and occupations of the men, tend very much to chain a large proportion of them to their own stations, because they could perform their duties of garrisoning defensive posts or of guarding cantonments in their immediate neighbourhood without being separated from their families and homes or deprived of their means of livelihood. This garrison duty is the proper *rôle* of volunteers and was recognised as such in the Indian Volunteers' Act of 1869, where it is expressly laid down that no member of a volunteer corps shall be bound, without his consent, to serve or proceed on duty beyond four miles from the place at which he was enrolled, unless he had voluntarily engaged to serve beyond these limits. Although the majority of volunteers would not be in a position to leave their homes, yet there will probably be in every corps some young men who would be willing to serve out of their place of residence, or to take the field if required to do so, and it might be worthy of consideration whether in each corps one or two companies should not be formed into active companies, and composed of men who are willing and able to leave their homes and occupations, and to take their place with the field army in an emergency. While serving in the field they would of course share all the privileges attaching to the regular army, including medals, rewards, &c. In England the number of volunteers being far in excess of what would be required for garrison duties, it has been suggested, we believe, to have a mobile and reserve force somewhat as proposed above, but the relative proportion of those who would be in a position to take their place in the field army at home would be considerably greater than could possibly be the case in India.

Necessity of engineer volunteers in India.

Another point about which it may be necessary to offer a few remarks is the want of engineer volunteers in this country. There are at present cavalry, artillery and infantry in India, but no engineers. This state of things ought to be remedied. In England at the present time there are 16 corps of engineer volunteers (of which one is a railway corps), and 9 divisions of submarine mining volunteers, giving a total strength of 11,101 engineer volunteers in England, of whom 10,805 are efficients.*

The officers consist chiefly of civil and mechanical engineers, and the non-commissioned officers and men are, as a general rule, enrolled from those connected with the profession of engineers or employed as masons, joiners, quarry-men, navigators or the like. For the railway corps, a special detail of trades is laid down in the *Volunteer Regulations.** Every officer appointed to a commission is required to pass an examination in drill and in military engineering, and a further examination on promotion to the rank of major, and if he fails to pass the prescribed examination after a second trial he is required to resign his commission. For instruction in military engineering, officers are allowed to go through a course at the School of Military Engineering at Chatham.

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* These figures are taken from the *Annual Return of the Volunteer Corps of Great Britain for 1887*, presented to both Houses of Parliament.

The annual number of drills required for efficiency in the case of recruits is 39 (including the inspection), of which 15 are engineering drills ; for the second year a volunteer has to attend 12 engineering and 24 other drills, and for subsequent years, 6 engineering and 9 other drills, including the inspection.

In the case of submarine mining companies, the officers are permitted to attend a course of instruction at Chatham to qualify in the subjects laid down in the regulations, and non-commissioned officers and men are also required to obtain certificates of proficiency. Each submarine mining company is exercised annually, for a period of 15 days, in the operations of laying out submarine mines on a system.

Besides the corps of engineer volunteers above mentioned there is an organization in England known as the Engineer and Railway Volunteer Staff Corps, which consists of officers only, without any rank and file†. This corps was first formed in 1865 and is composed of the general managers of all the principal railways, eminent engineers and railway contractors, and of the 28 officers of which it now consists half are railway managers and the other half engineers and contractors. The object of the formation of this corps was that the principal engineers and officers of railways should co-operate with the War Department in the defence of the country, and that the contractors should be called in when required for the construction of defen-

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* *Volunteer Regulations*, 1887, para. 36.

† **The normal strength of the Engineer and Railway Volunteer Staff Corps is as follows :—**

Lieutenant-Colonel Commandant	**1**
Lieutenant-Colonels	**29**
Majors	**20**
Captains	**20**
Lieutenants and 2nd Lieutenants	**40**
Total ...	**110**

But the corps is at present considerably under strength, there being only 28 officers.

sive and other works. So far, however, the duties of the corps have been confined to answering certain problems which have been submitted to them from time to time by the War Department, but in the event of an invasion, work would be carried out by ordinary civil labor under the orders of the officers of the corps, and bodies of navvies, plate-layers and other labourers would be organized for the construction of field works to impede and obstruct the advance of the invader and for the service of the railways.

Although the Engineer and Railway Volunteer Staff Corps would doubtless be of considerable value in England in case of an invasion, the organization is not one, in our opinion, suited to India, where the conditions are totally different to those which obtain at home, and it is only alluded to here as proposals have been put forward to introduce a somewhat similar organization in India.

As already mentioned there are no engineer volunteer corps in this country, but apparently the *Army Regulations of India* contemplate the possibility of the formation of such corps, as the sanctioned establishments, qualifications for efficiency, &c., for this branch, are therein laid down. The number of drills necessary for efficiency in a recruit is fixed at 20, (10 in drill and 10 in military engineering) and trained volunteers are required to attend 12 drills annually in military engineering. To qualify as an extra-efficient a member of an engineer volunteer corps must besides the above, attend 7 ordinary or engineer instruction drills, and in addition, must execute some simple engineering work before, and to the satisfaction of, the inspecting officer.

Proposals for the formation of engineer volunteers.

Of the total number of volunteers in India, 7,097 belong to the different railway volunteer corps, and of this number 6,111 are efficient (see Appendix).* These men are all servants of the several railway companies and state railways, and would in time of trouble be wanted for professional duty on the railways, but they could nevertheless be of much service in defending fortified places at the principal railway junctions and termini, and in guarding the line of railway. In order to be in a better position to undertake these duties, some modification in their present organization would appear desirable. At the present time the whole of the railway volunteer corps (twelve in number) are trained as rifle corps, but we would propose that in each of these corps (excluding the 3rd Punjab or North-Western Railway Volunteer Rifle Corps, which will be treated separately) a certain proportion, one or two companies according to the strength of the corps, should be converted into engineer volunteers, but still to be attached to the original body. Volunteers might be called for from those of suitable trades to make up these companies, and it is anticipated that there would be little difficulty in getting the numbers required. These companies should be provided with a special equipment of engineering tools, in addition to the tools already in the railway stores, and should be required to go through a certain number of drills in engineering instruction annually. The number (twelve) laid down in the *Army Regulations of India*, would, considering their previous training, seem sufficient.

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* It has already been proposed that any man entering Government service hereafter shall be obliged as a condition of service to become a volunteer and this rule would apply to all *employés* on state railways. It is most desirable that the staff of all our railways in India should become efficient volunteers. This, as already mentioned, is the case on the Canadian railways and there seems no reason why it should not be the same in India. It is believed that at the present time on the North-Western Railway every man is required on entering the service to sign a certificate that he will become a volunteer, and if this condition were extended to all state railways, there is little doubt that private companies would follow suit, if the importance of the matter were properly represented to them.

With regard to the officers, it would be necessary that they should receive instruction in field works and other engineering duties of a military nature, to enable them to carry out the training of their companies, and for this purpose they should be allowed to attend a course of instruction at the head-quarters of the Sappers and Miners at Roorkee, Kirkee, or Bangalore according as they were in the Bengal, Bombay, or Madras presidency, in the same way as officers of engineer volunteers in England are allowed to attend a course of instruction at the School of Military Engineering at Chatham. They might also be permitted, if they cared to do so when on furlough, to go to Chatham under the same conditions as officers of engineer volunteers in England. All officers should be required to pass the examination laid down in A. R. I. 1886, Vol. IX, para. 96-98.

The engineer companies of railway volunteer corps would, if thus trained, be capable of constructing defensive works, of putting railway stations in a state of defence, of securing any portion of the railway from injury or seizure, of repairing the permanent way when injured, and of generally protecting the line during times of disturbance.

Provision of armoured trains on main lines.

For the safe-guarding of the line, more especially the principal bridges, and to keep open the communications, it would be necessary to provide armoured trains at the principal places on all the main lines. These have not yet been introduced in India, but they have been used by us in Egypt with considerable success. They might be made up in the railway workshops in India, and should carry a light field piece or one or two machine guns on a truck, and have another truck attached to carry the necessary materials to relay or repair the line. The carriages as well as the engine should be bullet proof and should be capable of carrying half a company of infantry and some volunteer engineers accustomed to plate-laying.

Conversion of North-Western Railway Rifle Volunteers into a railway engineer corps.

With regard to the 3rd Punjab or North-Western Railway Volunteer Rifle Corps, which has purposely been excluded from the above proposals. This corps has at the present time 951 members enrolled, of which number 875 are returned as efficient. The *whole* of this corps we would propose to convert from a rifle corps into a railway engineer volunteer corps, somewhat similar to the 2nd Cheshire Railway Engineer Volunteers in England, which has its head-quarters at Crewe. This latter corps was only raised at the beginning of last year and comprises now an effective force of 23 officers and 607 rank and file. It is composed entirely of the men of the staff of the London and North-Western Railway Company, who in their ordinary vocations are smiths, fitters, firemen &c., and are undergoing in addition to the ordinary infantry drill a course of instruction in military engineering. Other railway companies in England, for example, the Manchester, Sheffield and Lincoln and the Metropolitan, following the lead of the London and North-Western, are now establishing volunteer corps, and on the South-Eastern Railway 2,000 men of the railway staff have recently expressed a wish to join a similar organization. The importance of having a body of men capable of efficiently working our railway service on the north-western frontier in time of war has long been recognized, and the formation of a railway service corps from the North-Western Railway formed the subject of the prize essay of this Institution two years ago. The writer of that essay proposed to form such a corps from three sources, (1) the existing staff of the North-Western Railway, (2) men of the British army reserves, and (3) men of the native army reserves, and he considered that such a corps should not be " classed as volunteers or militia but as a regular military corps and as such should be borne on the strength of the Indian army." It is not our purpose, nor is it within the province of this paper, to consider whether such a scheme is practical or feasible, any one who cares to do so can judge for himself by reading the essay referred to, in which the scheme will be found worked out in considerable detail. All that concerns us here is the utilization of the present North-Western Railway Volunteer Rifle Corps as railway engineer volunteers.

Such a body would naturally furnish the nucleus for any more extended scheme that might be adopted hereafter. The duties which it would be required to perform would be the working of the different lines included in the North-Western Railway system, and the proper protection of these lines. In the case of a war beyond our frontier, a great strain would be thrown on the North-Western Railway, and the best way to be prepared for this is to train the *employés* of the railway, in times of peace, in those duties which they would be required to carry out in war, and this could be effected by forming them now into a railway engineer corps.

In the *Regulations for the Organization of the Line of Communications of an Army in the Field** it is observed that "railways are of such paramount importanoe in war and their proper use is so difficult and so liable to produce confusion, that full and complete instructions are requisite," and as an attack on India from beyond our north-western frontier appears to be admitted, even by the highest authorities, as a possible contingency, too much attention cannot be given to all details connected with the concentration on the frontier, in case of emergency, of troops and munitions of war. It must moreover be borne in mind that as railways are a more vulnerable kind of communication than ordinary roads, it is all the more necessary that precautions should be taken to prevent any interruption in the working of the line, and provision should be made in the event of the demolition of bridges, permanent way &c., for their immediate restoration.

In order to carry out these duties the North-Western Railway Volunteers, when converted into a railway engineer corps, should be required to undergo a training similar to that already described for engineer companies of the other railway volunteer corps, but in addition they should be practised frequently in rapidly loading and unloading artillery and cavalry, and should also receive some instruction in the principles of the concentration of troops by railway. The officers should be required to pass the examination laid down in the *Army Regulations of India* for the engineer branch of the service. The provision of armoured trains for the protection of the line, already advocated, would, in the case of the North-Western Railway, be of even more importance than on other Indian lines.

It is not proposed that the services of the North-Western Railway Volunteer Corps should be utilized for the construction of new lines beyond the frontier, if such are required other means would have to be adopted. If a campaign had to be undertaken across the border, and rapid railway extensions had to be made, the services of engineer volunteers would no doubt be necessary, as the number of Royal Engineers in India would not be sufficient for the work, but it would in this case be better to call for volunteers from other parts of India and not to take away the staff of the North-Western Railway which could ill be spared at such a time.

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* Issued with *Army Circulars* dated 1st June 1878.

Among other duties which we would propose to assign to the engineer volunteers on the main lines of railway throughout India, would be the execution of plans for the defence of railway stations, the protection of important bridges and the rapid restoration of any bridges which may be destroyed on the line. These plans should be prepared beforehand and be available for use whenever required. They should be so designed that the material on the spot, such as rails, sleepers, &c., could be utilized for carrying them out, as it must be remembered that rapidity of execution would be of the first importance and there would probably be no time to procure materials from a distance.

Formation of submarine mining volunteer corps.

Another very important function which might be undertaken by engineer volunteers, is the defence of our great sea-ports by torpedos. The importance of defending our rivers and harbours in England has been fully recognized, and for this purpose in addition to the regular and militia submarine mining corps of Royal Engineers, there are, as already mentioned, nine divisions of volunteer submarine miners. At the present time, the arrangements for the defence of our Indian ports by torpedos are certainly imperfect, and it ought to be possible to raise at such places as Bombay, Karachi, Calcutta and Rangoon detachments of engineer volunteers, and train them as submarine miners. The class of men required might be obtained from the telegraph department, the dockyards &c., and might be organized and trained under the direction of the Inspector of Submarine Mining Defences in India. At present we believe this duty is carried out by one or more officers of Royal Engineers at each port, assisted by a few non-commissioned officers of Royal Engineers and some men of the native sappers and miners, but in practice this arrangement does not appear to work satisfactorily; native soldiers are of little use for this kind of work, and a further number of Europeans should be substituted in their place. These might be supplemented by the volunteers proposed, who would not only be able to assist in manning the boats and in submarine mining duties generally, but should be trained in the use of the electric light, which now plays an important part in harbour defence work.

Increase of garrison artillery volunteers desirable.

As already pointed out the garrison artillery in India is not sufficient to meet the requirements of all our defensive works, and for this reason every encouragement should be given to the raising of corps of volunteer artillery at all stations where there are forts to be manned, and this remark applies more especially to our great sea-ports where a strong force of garrison artillery will be required when the defensive works, now in progress, are completed.

Naval artillery volunteers.

In taking stock of our resources we must not neglect to utilize all the means to our hand, and it has been suggested that the seafaring men who come to our ports might be trained to work the guns in the defence works. It has been estimated that there are all the year round on an average some 1500 sailors in Calcutta and proportionate numbers at the other ports, and many of these if they had some training beforehand might be available to help in the defence of these harbours for a short time on an emergency. Of course these men are constantly changing and cannot be calculated on with any certainty, but a proportion of them are more or less stationary and might be utilized to form the nucleus of a corps of naval artillery volunteers.* At any rate in estimating our resources, it is well to bear in mind that we have at our principal ports a possible source of strength in the European seamen, and although we recognise the difficulties, it ought not to be impossible to devise some practical scheme to make use of their services for defensive purposes.

Conclusion.

In concluding this paper we would again urge the necessity of being prepared for every eventuality which may arise, the *present* is the time to complete our organization and to perfect our arrangements. When Philip II's Armada set sail from Cadiz, when Napoleon I was organizing his legions at Boulogne, when on the evening of the 18th June 1815, the remnant of the Guards were awaiting the arrival of the Prussians on the heights of La Haye Sainte, the future of England did not tremble in the balance more than when the sepoys at Meerut on the 10th May, 1857, raised the standard of revolt, and gave the signal for a conflagration which spread in a few days from the North-Western Provinces to the furthest district of Central India. It was the want of proper organization of the material we had to hand in the civil European and Eurasian population, and the want of timely preparations during peace, which contributed largely to the disasters which followed the outbreak at Meerut in 1857, but after the lessons of the great rebellion, it will be our own fault if we neglect to take every precaution in our power to prevent a repetition of the terrible scenes then enacted. It is the fashion in the present day in England, among a certain political party to speak lightly of India, and of the important part played by this magnificent dependency of the British Crown. It is true that India does not furnish to the mother-country a yearly tribute of ready money such as Java furnishes to Holland, or Cuba to Spain, but the benefits it confers on England indirectly are enormous. The number of English families who find an honorable means of existence in official positions or in business in India, may be counted by thousands and British capital is spread by millions over the country in indigo and tea plantations, in railways, banks, and houses of business. For the greatness of England the preservation of the vast domains of the Honorable East India Company is a question of life or death. India once lost it would not be many years before Great Britain fell to the rank of Holland or Denmark among the nations. This fate she was only saved from in 1857, at terrible cost by the skill of her statesmen and the courage of her soldiers. Although it is not likely that a crisis of an exactly similar kind will ever occur again in the history of India, yet there are signs of coming troubles both from within and without which we cannot afford to disregard. The mass of the native population of whatever race or creed, are without doubt perfectly content with our rule, yet there is a small minority, the product of the system of education which we ourselves have carried on during the last 30 years, who want to apply to India democratic methods of government, which England herself has only reached by slow degrees through the discipline of many centuries of preparation. This small minority are dissatisfied with the present state of things, and would, if they had the opportunity, intrigue for a change. The whole tendency of our present internal policy is to lower the influence and *prestige* of the European element, to which alone we owe our supremacy in India, and as we sow the wind so shall we reap the whirlwind. As long as the Bengali Babu and the Bombay Brahmin are encouraged in their pretentions, and the native press is allowed its present licence to stir up discontent and sedition in the country, so long are we preparing for ourselves troubles in the future.

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* A battery of naval artillery volunteers already exists at Calcutta (see Appendix).

Again, if we turn our eyes to the north-west, possible dangers may be seen looming in the near distance. Russia whose aims are so aggressive and unprovoked, has now advanced to within easy striking distance of Herat, and at any moment a conflict may be precipitated, the magnitude and results of which it is impossible to foretell. Nor, as we have seen, are our harbours or our fleet in such a state as to preclude all possibility of hostile attack upon our coasts or invasion from the sea.

In any case, whether the danger be from within or without, the necessity is the same, namely, that we should be in a position when the crisis comes, to utilize every available man whether European or Eurasian, in securing the safety of the empire. The subject is one of immense importance for the welfare of the British rule in India, and if the suggestions contained in this paper shall help, even in the smallest degree, to a solution of the difficult problem which it has been sought to solve, as to the best means of organizing and utilizing the services of the civilian European and Eurasian population for the defence of the country, the object of the writer will have been fully attained.

31st December, 1888.

sive and other works. So far, however, the duties of the corps have been confined to answering certain problems which have been submitted to them from time to time by the War Department, but in the event of an invasion, work would be carried out by ordinary civil labor under the orders of the officers of the corps, and bodies of navvies, plate-layers and other labourers would be organized for the construction of field works to impede and obstruct the advance of the invader and for the service of the railways.

Although the Engineer and Railway Volunteer Staff Corps would doubtless be of considerable value in England in case of an invasion, the organization is not one, in our opinion, suited to India, where the conditions are totally different to those which obtain at home, and it is only alluded to here as proposals have been put forward to introduce a somewhat similar organization in India.

As already mentioned there are no engineer volunteer corps in this country, but apparently the *Army Regulations of India* contemplate the possibility of the formation of such corps, as the sanctioned establishments, qualifications for efficiency, &c., for this branch, are therein laid down. The number of drills necessary for efficiency in a recruit is fixed at 20, (10 in drill and 10 in military engineering) and trained volunteers are required to attend 12 drills annually in military engineering. To qualify as an extra-efficient a member of an engineer volunteer corps must besides the above, attend 7 ordinary or engineer instruction drills, and in addition, must execute some simple engineering work before, and to the satisfaction of, the inspecting officer.

Proposals for the formation of engineer volunteers.

Of the total number of volunteers in India, 7,097 belong to the different railway volunteer corps, and of this number 6,111 are efficient (see Appendix).* These men are all servants of the several railway companies and state railways, and would in time of trouble be wanted for professional duty on the railways, but they could nevertheless be of much service in defending fortified places at the principal railway junctions and termini, and in guarding the line of railway. In order to be in a better position to undertake these duties, some modification in

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* It has already been proposed that any man entering Government service hereafter shall be obliged as a condition of service to become a volunteer and this rule would apply to all *employés* on state railways. It is most desirable that the staff of all our railways in India should become efficient volunteers. This, as already mentioned, is the case on the Canadian railways and there seems no reason why it should not be the same in India. It is believed that at the present time on the North-Western Railway every man is required on entering the service to sign a certificate that he will become a volunteer, and if this condition were extended to all state railways, there is little doubt that private companies would follow suit, if the importance of the matter were properly represented to them.

Corps.	Date of formation.	Head-quarters station.	Enrolled strength.	Number efficient.
Dehra Dun Mounted Rifles ...	24th July 85	Dehra Dun -	43	...
Sibsagar Mounted Infantry ...	29th Feb. 84 30th Apl. 86*	Amgoorie -	107	76
Calcutta Mounted Rifles ...	7th Oct. 81 1st Oct. 86	Calcutta - -	94	82
Upper Burma Volunteer Rifles ...	18th Feb. 87	Mandalay - -	132	56
Darrang Mounted Infantry ...	3rd June 87	Tezpur - - -	60	17
Lakimpur Mounted Rifles ...	27th July 88	Dibrugarh - -	139	97
RIFLES.				
Madras Volunteer Guards ...	2nd July 57	Madras - - -	457	301
Nagpore Volunteer Rifle Corps ...	29th Dec. 60	Nagpore - -	273	176
1st Punjab Volunteer Rifle Corps...	1st Apl. 61	Lahore - -	433	353
2nd Punjab (or Simla) Volunteer Rifle Corps ...	2nd May 61	Simla - - -	255	325
Calcutta Volunteer Rifle Corps ...	3rd Feb. 63	Calcutta - -	811	575
Bangalore Rifle Volunteers ...	21st Dec. 68	Bangalore - -	443	396
East Indian Railway Volunteer Rifle Corps ...	17th July 69	Jamalpore - -	1,089	1,057
Allahabad Volunteer Rifle Corps ...	11th Jan. 71	Allahabad - -	380	315
Mussoorie Volunteer Rifle Corps ..	24th July 71	Mussoorie - -	369	359
Naini Tal Volunteer Rifle Corps ...	26th July 71	Naini Tal - -	256	250
Oudh Volunteer Rifle Corps ...	10th Jan. 72	Lucknow - -	331	319
Thomason College Volunteer Rifle Corps ...	19th Aug. 72	Roorkee - -	37	35
Eastern Bengal State Railway Volunteer Rifle Corps ...	1st Mar. 73	Calcutta - -	266	203
Great Indian Peninsula State Railway Volunteer Rifle Corps ...	29th Dec. 75	Bombay - -	1,062	1,009
Moulmein Volunteer Rifle Corps ...	2nd July 77	Moulmein - -	320	289
Bombay Volunteer Rifle Corps ...	15th Aug. 77	Bombay - -	742	514

workshops in India, and should carry a light field piece or one or two machine guns on a truck, and have another truck attached to carry the necessary materials to relay or repair the line. The carriages as well as the engine should be bullet proof and should be capable of carrying half a company of infantry and some volunteer engineers accustomed to plate-laying.

Conversion of North-Western Railway Rifle Volunteers into a railway engineer corps.

With regard to the 3rd Punjab or North-Western Railway Volunteer Rifle Corps, which has purposely been excluded from the above proposals. This corps has at the present time 951 members enrolled, of which number 875 are returned as efficient. The *whole* of this corps we would propose to convert from a rifle corps into a railway engineer volunteer corps, somewhat similar to the 2nd Cheshire Railway Engineer Volunteers in England, which has its head-quarters at Crewe. This latter corps was only raised at the beginning of last year and comprises now an effective force of 23 officers and 607 rank and file. It is composed entirely of the men of the staff of the London and North-Western Railway Company, who in their ordinary vocations are smiths, fitters, firemen &c., and are undergoing in addition to the ordinary infantry drill a course of instruction in military engineering. Other railway companies in England, for example, the Manchester, Sheffield and Lincoln and the Metropolitan, following the lead of the London and North-Western, are now establishing volunteer corps, and on the South-Eastern Railway 2,000 men of the railway staff have recently expressed a wish to join a similar organization. The importance of having a body of men capable of efficiently working our railway service on the north-western frontier in time of war has long been recognized, and the formation of a railway service corps from the North-Western Railway formed the subject of the prize essay of this Institution two years ago. The writer of that essay proposed to form such a corps from three sources, (1) the existing staff of the North-Western Railway, (2) men of the British army reserves, and (3) men of the native army reserves, and he considered that such a corps should not be "classed as volunteers or militia but as a regular military corps and as such should be borne on the strength of the Indian army." It is not our purpose, nor is it within the province of this paper, to consider whether such a scheme is practical or feasible, any one who cares to do so can judge for himself by reading the essay referred to, in which the scheme will be found worked out in considerable detail. All that concerns us here is the utilization of the present North-Western Railway Volunteer Rifle Corps as railway engineer volunteers.

Corps.	Date of formation.	Head-quarters station.	Enrolled strength.	Number efficient.
Coorg and Mysore Volunteer Rifle Corps ...	21st Nov. 84 19th Aug. 87*	Mercara - -	225	155
Godavari Rifle Volunteers ...	9th June 85	Coconada - -	114	81
Chittagong Volunteer Rifle Corps	24th July 85	Chittagong -	71	63
Bellary Volunteer Rifles ...	24th July 85	Bellary - - -	72	38
Coimbatore Volunteer Rifles ...	7th Aug. 85	Coimbatore -	69	62
Malabar Volunteer Rifle Corps ...	14th Aug. 85	Calicut - - -	328	187
Madras Railway Volunteers ...	21st Aug. 85	Perambur - -	838	739
Vizagapatam Rifle Volunteers ...	16th Oct. 85	Vizagapatam -	182	113
Gauhati Volunteer Rifle Corps ...	13th Nov. 85	Gauhati - -	40	33
Yercaud Volunteer Rifle Corps ...	19th Feb. 86	Yercaud - -	48	22
Southern Mahratta Railway Volunteer Rifle Corps ...	20th Oct. 86	Hubli - - -	458	290
Poona Volunteer Rifle Corps ...	4th Jan. 87	Poona - - -	364	288
Fatehgarh Volunteer Corps ...	28th Nov. 82 28th Nov. 87*	Fatehgarh - -	72	51
Upper Burma Volunteer Rifles ...	18th Feb. 87 19th May 88*	Mandalay - -	201	85
Bengal-Nagpore Railway Volunteer Rifle Corps ...	15th June 88	Nagpore - -	338	228
		TOTAL -	19,555	15,908
RESERVES.				
Presidency Volunteer Reserve Battalion ...	30th Mar. 88	Dum-Dum -	330	...

EXTRACTS FROM OTHER ESSAYS RECEIVED.

"*To the utmost of our power.*"

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I would propose that any man over 35 years of age, who has served seven years with the volunteers, should become a reservist; up to that age no man should feel the drills and rifle shooting irksome.

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Much might be done to improve the volunteer officers and non-commissioned officers ; they might be allowed to attend drills and parades of British regiments, and, those that have time, be attached to regiments for a course of instruction. Again, they might be allowed to attend the musketry classes now held in the hills, Changla Gali, Pachmari, etc. The rank of the officers too might be more generally recognized.

It would be a great boon to volunteer corps if it could be managed that they should attend camps of exercise, and be brigaded with, and treated the same as, other troops. In these days, when yearly several camps of exercise take place at different stations in India, surely something of the sort could be managed? A few days in a regular camp of exercise would do more to teach the volunteer soldier the necessity of discipline than many months of company or battalion drill. We should also not hear complaints that volunteers had been hardly treated in being taken out too far for an occasional field day.

Drill, I am glad to say is getting yearly simpler and more practical, and does not require the amount of reading and minute practice that it did some years back—not that I would say that good, honest, practical work, such as will occur in real actions can be too much practised ; the more we work away at practical drill, the better we shall all be. But the intricacies of drill are less than they were, and in consequence the hard worked man will not have his time taken up by learning something that if he was led into action the sooner he unlearnt the better.

The Indian volunteer does not require to learn much beyond being able to be moved about, and how to shoot. The elements of the defence, and the throwing up of simple earth works, might also be learnt with advantage.

One more thing that the Indian volunteer might learn, and would find, not only useful but extremely interesting—that is visual signalling with flags, heliographs and lamps.

* * * * * *

The most important duty of the volunteer is to be a rifle-man in the true sense of the word. As Prince Kraft says of artillery that their duty is—"first to hit, secondly to hit, thirdly to hit," so might it be said of the rifle-man. The material of the volunteers is just what is wanted to make a good marksman, and many of them are good sportsmen. There is no reason that a great proportion of our Indian volunteers should not be as good shots as are the Boers. There are of course many shining lights among rifle shots in the volunteer ranks, but the majority, I fear do not deserve the name of rifle-men.

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Much might be done to help the shooting of the volunteer army, if Government would sanction rifle ranges, wherever there are a few volunteers stationed, near to where they live ; in many stations the ranges are far away, or else the volunteers are dependent on the ranges of other corps when they can get them, then probably the time that the ranges are vacant does not suit, or there is some other hitch.

Morris tubes also would be a great assistance both for recruits learning to shoot, and for men who had not time to go to the range to practise. A Morris tube shooting gallery can be put up almost anywhere, and would afford both instruction and amusement at the same time.

The lack of artillery volunteers is very apparent in this country.

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The artillery that there is at present in Calcutta, Bombay, Madras and Rangoon is absurdly small considering the importance of the places and the number of Europeans and Eurasians living in them. Karachi has no artillery.

Inland stations, which in times of general or local rising would have to hold their own against a thousand to one perhaps, and in many of which there are forts, as Lahore, Amritsar, Delhi, Lucknow, Agra, Allahabad, Chunar, etc., would be materially strengthened by a battery or so. Not to speak of machine guns—a few Gardners or Maxims would go a long way when well served, to make up for deficiencies in numbers against an Asiatic enemy.

The Asiatic has a great shrinking from artillery, the noise alarms him, and he does not stop to calculate which arm—artillery or infantry—causes the greater loss.

The 9 pounder which is now at last being replaced by the 12 pounder might be handed over with advantage to the volunteer army, and in time of war, if required to be used as field artillery, might be horsed locally sufficiently well to be moved about.

Of late years, a movement has been made in the direction of mounted volunteers; these are more easily raised in India than at home. Out here, the country-bred pony makes a most excellent mount for mounted infantry, and in this capacity the mounted volunteer is likely to be most useful. A few mounted men might prove invaluable in every station in the event of another mutiny.

With regard to the classification of volunteers, we have a large body of railway volunteers all over India, and most railway officials now entertained have to sign an agreement to serve in the volunteers of that railway. Now in a vast county like India, where so very much depends on our railway communications, the mere enrolment of railway *employés* as volunteers seems to be but making half use of the material we have at hand. About ten of the biggest rifle corps in India are composed of railway *employés*. Now these rifle corps, formed into battalions of a railway service corps, and further sub-divided into management companies and armour train companies, would I think, produce a very much more serviceable corps.

To the management companies would have to be attached a certain number of native writers, etc., and to the construction companies, gangs of workmen.

The armour train companies should be composed of picked shots, and also have a gun detachment with them, and, if possible, one or two machine guns, and the necessary detachment for working them.

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Another most important volunteer service might be formed from the telegraph department. Telegraph companies might be attached to the various railway service corps, as the telegraph community is comparatively small.

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The post office too might have a corps, which for service would detach companies and sections to work the field post office.

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The public works department, though unable to do more than provide officers and non-commissioned officers, could do good work if organized in a separate corps. Their experience in works of all kinds, and especially in dealing with native workmen and coolie labour, would be of great assistance on service in lightening the burden from the shoulders of the field engineers.

* * * * * *

Many officers of the volunteer corps, especially civilians, are well fitted to command the native garrison reserve, and thus do away with the necessity of officers from the active native army being detached from their regiments for this purpose. We have far too few officers at present with the active army and during the latter part of the Afghan war even, many Staff Corps officers in civil employ were recalled to military duty and posted to regiments, who believed themselves to have given up military duty for good and all; a civilian is eminently fitted to command the garrison reserve of his district. The examples of Lawrence, Montgomery, etc., during the Mutiny should ever be before the civil servant volunteer.

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Finally I would say, let Government on its part give every encouragement to the volunteer; by recognizing the *status* of their officers more; by arming them with the best weapon going; see that they have ranges, and every appliance for learning the proper use of their rifles; encouraging and assisting public servants to join the force; and in every way trying to cause the volunteer army to be looked upon as a real thing, likely to afford it the greatest help in times of trouble. The expenses for the poorer class of European and Eurasian might be lightened, the Government helping clerks, etc., even beyond the capitation grant. Indeed, volunteering should not be allowed to be an expense to anyone: all necessary expenses ought to be borne by the Government. It is enough that the volunteer provides the man, let Government arm and clothe him entirely.

Let Government also sanction the increase of the volunteer artillery, and either provide guns, or give the volunteers the opportunity of using the guns of the active army until such time as they can be provided with guns, though the latter is a very lame way of getting ready for the emergency, which may come upon us at any time. Also let it provide machine guns as auxiliaries to the comparatively small volunteer army we can ever have for a country like this, even if every able-bodied man enrolled himself. Until the country still further develops itself and more Europeans settle down in it—till more Europeans look upon India as their home—we shall never have a comfortable hold over the country.

" *The blast of war blows in our ears,*
* * * *
" *Stiffen the sinews* "

Shakespeare.

* * * * *

We have seen that the regular troops must be concentrated at the important centres of India, and therefore the smaller posts in remote districts where a disturbance might be fraught with lasting injury, must remain destitute of troops unless we employ the volunteers and concert other means for maintaining law and order. This is an unavoidable contingency, and we will therefore define the duties of the Indian volunteers when auxiliary to the British forces to be:—

(1) The protection of minor centres in which it is not advisable to retain regular troops.

(2) The security and maintenance of uninterrupted road, railway and telegraphic communication throughout the country.

(3.) To give confidence to the well disposed and awe the disaffected within our borders.

(4.) To leaven the contingents of native princes, whose services may be requisitioned, near the borders which are liable to incursions from savage tribes, e. g. Burma, Assam, Sikkim, &c.

(5.) To provide detachments of railway volunteers for service beyond the frontiers.

* * * * *

Even if all the volunteers borne on the rolls were ready to move to-morrow to any remote part of India, it is absurd to suppose that their corps could carry out the programme we have proposed for them, insufficient as they are in numbers, in equipment and in preparation. Deductions for sick, untrained men and absentees, must be made : finally trade and commerce would be paralysed, and the monetary loss alone would condemn such a move.

Volunteers corps must be divided into *local* and *active* or *service*[*] companies, composed of members who are willing to serve, respectively, locally or at a distance. The necessity for separate corps does not exist : calls of the nature we have indicated will be of rare occurrence and only made in times of grave national emergency.

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The retention of the *service* companies in the local regiments will, besides being convenient for administrative purposes, add considerably to their efficiency, for these companies must receive a special training. Members whom circumstances or inclination attract to the *active* companies can be transferred to them without difficulty. The framing of rules specially applicable to the *service* companies must be vested in Government, and not in officers and members as Art. 24 of the Regulations allows for existing corps. Section XVI of Act XX of 1869, concerning the local use of volunteers must also be remodelled to suit the proposed alteration in the terms of enrolment.

* * * * *

Turning to *enrolment*, the first question which naturally forces itself on our attention is how to ensure sufficient men for the volunteer *service* companies.

This may be secured as follows :—

(1.) By drafting voluntary members from the *local* to the *active* companies.

(2.) By increasing the number of volunteers and making additional concessions to those joining the *service* companies.

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Another method of popularising the service is to encourage volunteering in the many European schools which are now established all over India. Prizes might be offered to boys perfecting themselves in military exercises ; a liking for these would be inculcated in early life, and on attaining manhood many of the lads would be anxious to keep up this attractive form of recreation and the volunteer ranks augmented accordingly.

To encourage men to join the *service* companies Government might consider the advisability of conferring privileges on members ; finding employment for them in offices, railways, as supervisors of labour &c., &c., according to their several abilities and permitting them to attend their training without loss of salary: and offering state education to the children of men who had served meritoriously for a specified period.

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[*] The writer uses the terms *active* and *service* companies synonymously throughout this essay.

Additional grants should be made to volunteers belonging to the *active* companies : these might be applied in the following manner.

(*1.*) *In increasing the capitation grant.* This is not an unreasonable request when we require a higher standard of efficiency from the men.

(*2.*) *In pay for qualified volunteer instructors.*

To attain the required qualifications, commanding officers should keep a list of intelligent candidates who might be attached to British corps, and receive the pay of their rank, if they succeeded in passing the test, at the end of their period of probation. This increase of cost might be defrayed, by reducing the number of drill instructors selected from the British forces, and introducing in their stead, a sprinkling of volunteer instructors. It is not advisable, however, to have more than a proportion of these men, and those obtaining certificates in excess of the establishment can remain as supernumeraries receiving pay only when employed.

(*3*). *In making an allowance on a fixed scale for travelling expenses.*

Article 417, A. R. I. allows volunteers proceeding "on duty" to travel on certain railways in the next higher class of carriage than that for which they purchase tickets. Granting *free* passes on state railways to the volunteers of the *service* companies when proceeding to camps, drills, and ranges would be a further allurement to men of small means to join them.

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The difficulty of horsing and transporting field guns, and the drain on the supply of horses, which a great war must entail renders it improbable that sufficient would be forthcoming to horse volunteer artillery, and consequently instruction in the duties of such would be a mere waste of valuable time.

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The volunteer *active* companies must be provided with machine guns. Mules and ponies should be trained to carry them, the latter will probably be the means of transport as the mules will have been requisitioned for the regular troops.

* * * * *

We have previously stated that the principles which govern the distribution of the army in India are :

(1) that all points of strategical, political, and commercial importance must be held :

(2). that railway, road, and telegraphic communication must be maintained intact:

(3). that movable columns must be formed for the suppression of local insurrections.

We have seen that (1) is still the task of the regular troops: but that (2) and (3) must devolve on an *active* volunteer force.

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It should be made law therefore that Government may at any time call upon every able-bodied European and Eurasian to take up arms in the defence of his usual place of residence. To enable him to comply with this summons, each individual must be subjected to a brief military training, and mutual combination must be inculcated from its commencement.

Our first procedure is to advocate the immediate formation of this material into reserve battalions of existing local corps, and at the same time to insist upon the commingling of classes.

A reserve battalion has recently been raised at Calcutta, and the rapidity with which it is becoming efficient is a healthy sign. The tactical drawback of the inequality of companies will not exist in the chief towns, and in the smaller ones, this will be immaterial and unavoidable. Any number of men short of the number of a battalion should be added as fresh companies to the nearest reserve battalion.

In Calcutta and other large towns when embodied, brigades can be constituted, and the training will be conducted on the same lines as those delineated for the local volunteers.

The conditions of service and the organization should be framed to suit men of all ages: we suggest—

(1) That every able-bodied male between the ages of 18 and 60 should be taught to use a rifle.

(2) That every man between the ages of 18 and 40 be enrolled in the *first reserve*, and every man between the ages of 40 and 60 in the *second* reserve.

(3) That the first reserve attend an annual training.

(4) That this training shall extend over seven days.

(5) That the first reserve be liable for embodiment in support or in augmentation of their *active* aud *local* volunteer battalions.

(6) That after their first training, the second reserve will muster annually, and be liable only to be called out in a national emergency.

(7) That battalions be termed first reserve and second reserve battalions respectively, and that where paucity of numbers does not allow of this distinction, the companies of a corps be termed first and second reserve companies.

(8) That the head-quarters of the local volunteer corps be the centre of mobilization and administration, and that each reserve battalion must look to local head-quarters for orders and instructions.

(9) That the training or muster take place within a reasonable distance of a man's home.

(10) That companies in remote stations must have a complete organization of their own and be capable of independent action.

(11) That in all schools in India, a military training should form a compulsory part of a boy's education.

(*N. B.* This in time will render general service merely a nominal obligation).

(12) That an Inspector General be appointed to each district, his duties being to attend trainings and arrange mutual co-operation wherever possible between outlying companies. General duty officers would be available for these appointments.

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The introduction of general service is calculated to promote an influx into the volunteer ranks: men finding themselves interested in their instruction and pleased with the leniency of the system would think nothing of attending a few extra drills in order to quality as "efficient" volunteers.

"Why, then 'tis time to arm and give direction."

* * * * *

Having so far dwelt upon as it were the preliminary aspect of the question of an effective auxiliary force, it is perhaps time to come to the measures which in the writer's opinion may tend to provide what is wanted. In submitting a sketch of the proposals with this view, I have endeavoured to confine myself to measures, not as they *ought* to be but as they *can* be. A discussion of what ought to be done has perhaps only an academic interest, if all suggestions are not strictly subordinate to the primary condition that they shall be capable of being carried out. A theory in these matters is of no use unless it can be put into practice.

The whole subject of the steps for raising a force which shall be of material assistance, under given circumstances, to the regular army, falls under two heads :—

(*a*). The creation of an effective force.
(*b*). The means for its effective application.

As regards the first postulate, it will have been observed that at present the volunteers are the only auxiliary force in India, that no one can be obliged to join this force or to remain in its ranks, or to make himself "efficient"; and that serious complaints have been made of its want of proper discipline, and perhaps of drill also, by "drill" being meant in a general sense acquaintance with the work of a soldier. It is possible that during the years preceding the recent Afghan War, the constitution of an auxiliary force, was sufficient for the requirements of the case. But in later years, if the condition of affairs has been correctly represented at the beginning of this essay, something more closely approaching to the discipline and efficiency of the regular army is necessary, if the auxiliary troops are to take their proper place in modern warfare, if they are to give a real support to the army, and should the need for it ever arise, join the regular troops; this last contingency must be faced and reckoned for, although it may never arise. Looked at again from another point of view, if much time and trouble is expended on an instrument of war, it is obviously true economy to have that instrument brought to as high

EXTRACTS FROM OTHER ESSAYS RECEIVED.

"To the utmost of our power."

* * * * * *

I would propose that any man over 35 years of age, who has served seven years with the volunteers, should become a reservist; up to that age no man should feel the drills and rifle shooting irksome.

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Much might be done to improve the volunteer officers and non-commissioned officers; they might be allowed to attend drills and parades of British regiments, and, those that have time, be attached to regiments for a course of instruction. Again, they might be allowed to attend the musketry classes now held in the hills, Changla Gali, Pachmari, etc. The rank of the officers too might be more generally recognized.

It would be a great boon to volunteer corps if it could be managed that they should attend camps of exercise, and be brigaded with, and treated the same as, other troops. In these days, when yearly several camps of exercise take place at different stations in India, surely something of the sort could be managed? A few days in a regular camp of exercise would do more to teach the volunteer soldier the necessity of discipline than many months of company or battalion drill. We should also not hear complaints that volunteers had been hardly treated in being taken out too far for an occasional field day.

Drill, I am glad to say is getting yearly simpler and more practical, and does not require the amount of reading and minute practice that it did some years back—not that I would say that good, honest, practical work, such as will occur in real actions can be too much practised; the more we work away at practical drill, the better we shall all be. But the intricacies of drill are less than they were, and in consequence the hard worked man will not have his time taken up by learning something that if he was led into action the sooner he unlearnt the better.

in Europe whose very existence depends upon their military strength. It involves the registration of every person liable to be called out, this register could be maintained by district (civil) officers, copies being sent annually to army head-quarters; it implies the preservation (at convenient points for issue) of arms and equipment, commissariat and transport, and of some kind of uniform; and the previous preparation of a carefully worked out scheme, (to be modified from time to time as may be advisable), for the proper concentration of the *landsturm* and the placing of its members under the command of superior officers, in fact for attaching them to forces, whether regular or auxiliary, which are already out on service when the *landsturm* is mobilized. As regards the value of the *landsturm* all that can be said is that most men in India can shoot, more or less; and that those who had received a military training at some period in their lives would, in proportion, be more useful.

The second proposal has already been treated in one of the essays published in the Journal of this Institution to which reference been made. It may be termed "compulsory" volunteering, it has been argued that "voluntary service would lose its chief worth, not to mention its very meaning also, if it were either compulsory or paid for. It is the spirit in which such service (volunteering) is undertaken that constitutes its real value, and to destroy that spirit by resort to coercion ...... would be to remove one of the proudest boasts of the English nation."

No doubt; but in the same essay occur the observations on the remarkable want of volunteer discipline under the existing system which I have quoted. There is however no compulsion in the matter. No one is obliged to take service under Government. And it stands free with every employer to make his own conditions of employment with those whom he employs. If they do not like it, they need not take it. Experience is ever the safest guide; and it has not been found that where, as in a well known Indian railway corps, enrolment in the volunteer force is a condition of service there is either a lack of candidates for employment or that volunteering is distasteful to those thus enlisted. On the contrary, the zeal and efficiency of corps so formed will probably be found inferior to none. At first sight it is not perhaps quite realized what this proposal means. It signifies an equality of obligation for the defence of India throughout all the *strata* of official society in India; the judge and the bailiff, the clerk and the collector, the engineer and his draftsman, will stand shoulder to shoulder on duty. If there is any repugnance or any false shame in the matter or any dislike to the physical exertion, then all one can say is that we are lamentably wanting in that spirit which induces continental nations cheerfully to suffer hardship and toil for the sake of their country and which leads high and low to enter the same ranks with a common purpose. With the formation of a body of public service volunteers accomplished, we should have in every civil station in India a knot of men trained to arms ; in police officers they would find their natural drill instructors ; on the police ranges they would practice musketry ; with such men one could insist upon a more thorough course of instruction ; it would be little to ask for at least one weekly drill instead of the 20 annual drills or 12 now demanded from volunteers ; their officers would be picked by Government and not, as now, except in railway corps, elected by the men ; and the higher class of officials who as a rule are now conspicuous by their absence would be swept into the volunteer net. It will be understood, that this condition of enlistment as a volunteer incumbent upon a Government servant would be enforced in the case only of those who enter the service after a prescribed date ; but it is not impossible that once this rule has been promulgated and is enforced, the majority of those now in Government employ would, if they have not done so already, join the volunteer force for shame sake, if for no other reason. The system herein advocated would ensure a high state of discipline, and as a sequel would come a high state of efficiency. For light offences, simple punishments would be inflicted ; for persistent or wilful inefficiency or grave misconduct, departmental notice might be tried, while the worst class of military crime which would carry with it dismissal from the volunteer force should be accompanied with stoppage or loss of promotion, and in extreme cases with dismissal from Government service.

The objection may be raised that somewhat drastic measures are proposed, to which the reply is obvious that modern circumstances require highly disciplined soldiers, men who for a period of years have submitted to a course of stringent discipline, and not men who in a fit of enthusiasm or under the pressure of great political excitement or national danger, consent temporarily to subject themselves to constraint and to orders, and that high discipline must be attended in the back-ground by drastic measures held in reserve.

Assuming that a corps of public service volunteers has thus come into being throughout India, it will not be difficult to assimilate the conditions, *mutatis mutandis*, under which the non-service volunteers would be engaged to those conditions which would be observed by the service men. After all there is no difference between the two classes except the accident of service and what one set of men can accomplish, the other set can undertake to perform, if they possess the true spirit of volunteers and are conscious that in military matters, as in all the other business of life, there is no standing still; that there must be a constant striving for improvement, irksome though it be at times, or else a retrograde movement. It is likely that all volunteers would cheerfully assent to a tightening of the bonds of discipline, to undergoing more drill or more instruction, although all this would bring with it increased demands on their leisure and their ease. The precise details in which, if these suggestions are practicable, the Volunteers' Act should be amended, may well be left for separate consideration.

Having, now, obtained a force which shall, as nearly as can be done under the circumstances, possess the characteristics of regular troops; the next point is how so to apply it that it shall locally protect life and property and set free for service in the field a portion of the regular army.

The essential condition here is that the auxiliary force must, like the army, be specially directed by the head-quarters staff. There must be one central authority occupied with the general direction and utilization of the auxiliary forces, and with nothing else. The present theory is to have a number of small independent organisms, with, it must be confessed very independent results. They must all be welded into one body and move like one man. If this force is to act in support of the army, it must be in touch with the army; it must work in concert with the army; and long before the hour arrives for so working in concert with the troops, the necessary plans and schemes must have been completed in detail, or else there will be nothing but confusion. The head-quarters staff must contain a distinct branch devoted to the auxiliary forces, which will work through the general staff of the army. The idea is not new, it has been advocated before (*vide* Essay II of the essays on the "Volunteer Force of India" U.S.I. Journal, Vol. XII), under the guise of a "volunteer department." Whatever we may call it, the need for a head of its own to the auxiliary organization is palpable. The officer charged with the general staff duties of the auxiliary forces, and his assistants, will have to work out the manner of support which the volunteers and *landsturm* will give to the army, according to the demands of the day and the circumstances of each case. This will not abrogate in any manner the power which in times of peace the local governments would continue to possess in respect of volunteers. The auxiliary forces within each military district would of course for the purpose of that district be under the officer commanding it in regard to military duty, on service and in training, commissariat, transport, &c. But where combined action is required and auxiliary action has to be taken over a large area, directions from a central authority are indispensable. If the recommendations of the Army

Commission are adopted, and the Indian army is divided into four army corps, it will probably be found most convenient to place auxiliary force staff officers on the staff of each army corps as well as on that of the Commander-in-Chief. With these staff officers, in communication with the military district staff, it will rest to arrange and determine in detail how, in the event of their being required to do so, the auxiliary forces within each district or army corps shall support or relieve the regular troops.

It is impossible to go thoroughly into the subject here ; to say what bridges, what stations, and fortified points, what railway stations, railway and road centres, &c., the auxiliary men should hold. To do this requires an intimate knowledge of India such as no single individual can aspire to, and matters of this nature can be dealt with satisfactorily only on the spot. It would be of no value to offer suggestions.

The matters to which I have ventured to direct attention have a general bearing. Briefly recapitulated they are ; bring your auxilary forces to the highest practicable point of efficiency, and secondly, provide a machinery which shall guide their energy to the greatest profit. Having done so, we may confidently count upon possessing in our hands a reliable substitute for a portion of the regular army, and a leading element in maintaining the integrity of our Indian empire.

"*Quot homines, tot sententiæ.*"

* * * * *

It will be observed from the above that we condemn any attempts to raise and place alongside our front line, bodies formed from the European and Eurasian population as auxiliaries. Yet we would gladly see an exception to this rule, viz :—in the raising of a railway and telegraph corps, which would bind itself for active work in time of war. When we look at the astonishing rapidity with which railways have been constructed in this country, and especially at the fact that most of the lines are strictly speaking strategical ones, and that, moreover, India *par excellence* is the country where the organization of a railway corps would recommend itself as the most suitable one, we can only wonder at the apathy with which this subject has for so long, been treated.

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As regards telegraphs, it has been customary to employ in our campaigns men from the army who have acquired the requisite knowledge by undergoing during peace time, a course of instruction. This procedure appears to be open to objection, as our European regiments are thereby unnecessarily weakened. A telegraph company for active warfare can easily be formed from the European and Eurasian non-military residents in India. We feel certain that volunteers for such a work will be forthcoming if sufficient inducements are held out to them.

Setting aside a discussion on the objections that have been raised against the employment of European and Eurasian subjects, we are of opinion that an immense advantage will be gained if suitable members are selected therefrom to supplement our officer corps in time of war. The difficulty of keeping up a sufficient number of officers to meet war requirements is experienced by almost every country on account of the expense that stands in the way of maintaining a complete corps in time of peace. The formation of an additional officer corps by falling back upon general resources which the non-military population so abundantly affords has, undoubtedly, been carried out with the greatest perfection in the German army. There young men with the necessary educational qualifications are permitted to serve one year instead of three, to satisfy the military requirements of the State and to prevent at the same time, a too long service interfering with the course of their future career, on the basis that their superior educational attainments will more than equalize the difference in time. Great attention is bestowed on these men during their year of service, so that the knowledge acquired by them may fit them for the position of an officer. On their passing the necessary examination, they are posted as reserve officers to different regiments. During the time they are maintained in this position, they are called out for periodical trainings. On these occasions they are entirely considered as forming part and parcel of the officer corps of the regiment : they wear exactly the same uniform and enjoy the same privileges. Now, if we accept that the demand for a year's training is chiefly made to allow no exception being made in the universal obligation of each subject to serve the State, it must be admitted that young men employed in the civil service and in different uncovenanted appointments can, without hindrance to the public service, be made to acquire sufficient technical knowledge to form valuable material for supplementing the officer corps of our Indian army.

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This is not the place to devise and discuss the details of such a scheme. But, as a foundation for it, a free choice for a particular regiment in which they would like to serve, appears to be a necessity. They should, moreover, be considered as integral parts of the officer corps, and there should be no distinction in any way in the uniform, equipment, &c. The selection of a corps will carry with it that *esprit-de-corps* which will prompt them to acquire the technical proficiency so necessary for their position. Where there is a will there is a way, and there is no plausible reason that we know of why such a project should be considered problematic in its results. A valuable addition may similarly be obtained for the military departments of the army. We have the precedent before us : men have been taken from the civilian class for the commissariat and transport departments. But at a time when a compaign had taken place they were rather rough material, under the disadvantage of not knowing anything about their work, and they were, therefore, at the commencement more an encumbrance than a help. A previous training, on the other hand, would have enabled them to fall at once into their proper places.

We take in hand now the second subject of our paper, namely, how far non-military European and Eurasian residents can be utilized to serve as volunteers. Here we have already, to a certain extent, a basis to go upon, namely, the different volunteer corps which exist in this country. The subject restricts itself, therefore, to the enquiry as to how far these can be supplemented and those already in existence rendered more useful.

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Every officer in charge of a district should consider and submit proposals as to what extraordinary measures should be taken to maintain order and authority, to counteract the denudation of troops from the country, and secondly, what procedure should be adopted in extreme cases consequent upon the failure of the first. Such a plan should be laid on the basis of a local volunteer corps, and we do not think it would be exacting too much if lines were laid down making it incumbent on every non-military European or Eurasian subject to find his place, when required, to fulfil his obligation to the State and at the same time aid in the defence of himself and his family. There are a great many places in India where the formation of such a local corps can be made with a very trifling demand upon the time of the individuals concerned and with immense advantage to themselves, especially, when it is considered that what is required of them will be confined to a limited sphere of work, such as the handling and firing of a rifle. We have specially mentioned that the proper solution of this problem should be left in the hands of the superior civil administrators of this country, partly, because any organization decided upon by them would, in all probability be best suited to their special part of the country, and partly because it would have the *imprimatur* of their authority which would induce many of the people to take to it *nolens volens*, who if left to themselves would look with apathy upon any such project or the benefical results that might eventually accrue to them from it.

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Discussing, moreover, the movement in general, it will not be disputed that our volunteer corps as a rule aim at too muc[illegible] sive tactics. In our opinion this is a mistake, since there [illegible] remote possibility of a demand in this direction being [illegible] them ; their endeavours, on the contrary, should be di[illegible] learning the work required in the defence of a plac[illegible]

The attention which is now paid by volunt[illegible] ing is praiseworthy, but the erection of defensi[illegible] best manner in which a suitable place can b[illegible] possible time, in a good state of defence, sho[illegible] paid to it. If the abandonment of offen[illegible] this, any time at their disposal, it will b[illegible] used in acquiring a knowledge of big[illegible] occasion when defence is needed, a few [illegible] most useful.

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Major-General Sir JAMES BROWNE, K. C. S. I., C. B., R. E.,
Quarter-Master General in India, in the Chair.

A TRIP TO BOKHARA.

By Colonel A. LeMessurier, C. I. E., R. E.

The Chairman, in introducing the lecturer, said that if the railway to Bokhara had done nothing else it had at all events caused a much livelier interest among Englishmen than existed before on the subject of Central Asia. He introduced Colonel LeMessurier to them as a railway engineer who was specially qualified to deal with the subject of the new Russian line to Bokhara.

I appear before you at the request of my friend Captain Mason, the Secretary of this Institution. Colonel Maitland, most kindly connected me with the excellent lectures on the Russo-Afghan frontier which had been delivered by Major Barrow and himself * but I would ask you to remember that my visit to Central Asia was quite unofficial, and without the support or knowledge of Government.

It was performed in the private capacity of an officer returning from furlough to his duty in India and with only such information at his disposal as is available to the public.

The story I have to tell is therefore a very simple one. It will state in plain words, a part of what I have seen on my trip from London to Bokhara and if time permits, something of my ride through Persia to catch the Bombay steamer at Bushire.

Without dawdling over the preliminaries of packing let us imagine that a start has been made. The baggage consists of two Gladstone bags, a hand bag, a bundle of rugs, a canvas sack containing a saddle and bridle, or 5 articles weighing 121 lbs. all told.

From London to the foot of the Caucasus mountains the journey may be done easily in five stages.

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* These lectures have not been published.

At Berlin you can see the fish market in the morning, peep at the Emperor's window, mount the Victory monument, ride on a tramcar through the Thiergarten to the Zoo and listen to the Opera.

Warsaw is nothing more than a huge entrenched camp with an old and a new town. It has a citadel with barracks and prisons for Nihilists. General Gourko is the governor. The Jews' quarter comprises no less than 24 streets.

Kiev, the Jerusalem of Russia, is as may be supposed full of churches and crowded with pilgrims. The catacombs of St. Anthony are altogether inferior in size to those under St. Sebastian in Rome.

Rostov is at the head of the sea of Azov with good snipe shooting in the neighbourhood. It is now the Don Cossack country. It is free, the territory belongs to the commune, and the use of the land and pasture is open to all. Every Cossack is obliged to equip, clothe, and arm himself at his own expense and to keep a horse. While on service beyond the frontiers of his own country he receives rations and provender and a small amount of pay. The war strength of the Cossacks of the Don is about 50,000. There are others also, viz., of the Black Sea, of the Kuban and of the Terek along the northern slopes of the Caucasus, numbering probably another 50,000.

The railway runs through Cossack and Kalmuk country, skirting the hunting grounds of Circassia (where one can shoot large game of all kinds and catch trout weighing 30 lbs.), to the terminus at Vladikavkas in Cis-Caucasus.

Russia in Europe is roughly one-fourth larger that our Indian possessions with only one-third of the population. Her public debt is equivalent to that of Great Britain and Ireland.

CAUCASIA.

Until the siege of Kars most people were ignorant that Russia had any territory in the Caucasus at all although in 1828 a Russian army, in one campaign secured Anapa, Poti, Ardahan, Toprakale, and Bayazid for the Czar.

Now, the frontier of Russia is consolidated along a line which includes the provinces of Batoum and Kars, touches Mount Ararat, follows the Arax and includes a piece of the Caspian littoral as far south as Astara.

The Georgian Military Road.—The Caucasus range of mountains is divided into two parts by what is known as the Darial or "Narrow" pass through which the Georgian military road runs, the only route available for carriages and which on account of its strategic importance as leading through the "gate of the Caucasus" naturally elicits a considerable amount of attention. As the crow flies the distance between Vladikavkas and Tiflis is 100 miles, by the road it is 134. The summit of the pass is about the height of Jakko.* The time for the journey by *diligence* or coach is 36 hours with halts aggregating 11¼ hours. The direct journey takes 28 hours and by private carriage the distance is accomplished in 15½ hours; the charge for 4 horses, conductor, grooms, coachman, &c., coming to about 50 *roubles*.

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* This is the highest point of Simla and is about 8,000 feet above the sea level.

The first stage is to Balta at the mouth of the pass and the second to Lars in the gorge. The start from Lars towards Kasbek is made with 4 horses in the wheel and three in the lead abreast with a post-boy on the off leader. The road is still in the gorge which narrows rapidly until it becomes a mere passage between high hills. The road hugs the sides, first on one bank, then on the other and in many places is cut out of rock where the strata are contorted in all directions, while mountains of *debris* block the river bed. It is from this part that the pass has been named Darial or "Narrow", and here tradition has placed the fortress from which Queen Tamara used to cast her lovers into the torrent below. Here also stood the *Castellum Cumania* which according to Pliny and Strabo defended the "gates", and on this spot the Russians have erected their own fort and called it Darial.

Kasbek is the chief scene of Lermontoff's 'Demon' the Russian Faust, a mixture of Paradise Lost and the book of Job, a beautiful poem ending, as with Marguerite, in the apotheosis of Tamara the heroine.

At Kobi the sleighs for use in winter were all stacked under sheds.

The summit is called the 'Mountain of the Cross' from a cross planted here in 1824 by General Yermontoff "in token of the domination of Holy Russia."

One may pause here a moment. It is probably the point where the traveller leaves Europe and enters Asia.

The Hessours a tribe about 7,000 strong dwell on the slopes of these mountains near the pass. They say they are "descendants of the Cross"; although Christians by profession they eschew fowls and pork, they offer sacrifices like the people in Coorg to the spirits, they observe Friday, they wear coats of mail and their robes are covered with either black or red crosses.

Three of the leaders and two of the wheelers are taken off the coach before the descent to Gudaour.

The descent from Gudaour to Mlete (about 3,000 feet in 11 miles) is without doubt admirably accomplished and it is this piece of engineering particularly which it is said has gained for this road the credit of being the finest work of its sort in the world. The road is carried on high masonry revetments in long lengths along the steep mountain side which has almost a perpendicular fall into the ravine below. The work is undoubtedly good but I do not think the Georgian military road is superior (certainly not as far as its upkeep goes) to the existing road made by the French from Beyrout across the Lebanons to Damascus, or to the old road across the St. Gotthard, or nearer to us here to the roads up the Bhore and Tal Ghats in Western India.

Ananour contains one of the archæological curiosities of the Caucasus, *viz.*, the fortified monastery of St. Khitobel.

At Mtszkhet the solitude of the mountains has merged into the busier life of the plains. On the river Koura huge rafts of 20 big trees are being floated off and beyond it runs the railway with the Anglo-Indian telegraph wires. This place, the ancient capital of Georgia, is said to be the oldest town in the world, Damascus not excepted. Its church possesses the rare relics of a shirt worn by Noah and our Saviour's seamless robe. The whole landscape approaching Tiflis is not unlike what one might expect to see in the Deccan in the hot weather if the trees were removed.

Tiflis.—On arrival at Tiflis I called at the palace to present a letter of introduction to General Shepeloff. An under secretary informed me of that officer's death from drowning four days previously at Baku. I left the letter and asked for an interview with General Shepeloff's successor.

Later in the day I was received by General Sheremetieff. He was in uniform, slightly lame and walked with a stick. He at once received me in a most friendly manner. I explained that I was returning from furlough to my duty in India, at my own expense and asked for permission to see the Trans-Caspian railway. It was then explained to me that this railway was a military undertaking and not open to the public and that reference to higher authority was necessary before any one could cross the Caspian. M. Rogget and a civilain were also present. The conversation was all noted down and in less than 10 minutes the interview was at an end.

Tiflis the capital of the Caucasus has probably 120,000 inhabitants. It is prettily situated on the Koura in an amphitheatre of hills with the river dividing it into two parts. Many of the *boulevards* are quite European, that is to say with large handsome buildings, certain spaces being left for fresh air and recreation. Other thoroughfares, again are quite Oriental, narrow, tortuous and confined, with the ordinary appearance of an eastern market resembling that of Smyrna more than the one at Constantinople. In the Russian quarter there are hotels, shops, theatres, studios, clubs, *cafés,* libraries, museums, &c., with carriages plying for hire, while in the native quarter there is every kind of shop and apparently every kind of man with animals and beasts of burden of every sort blocking the road. A visit should be made to the hot sulphur baths where the attendants smother one in soap bubbles of a most delicious fragrance. Then a walk should be taken through the Botanical Gardens and up the slopes to Naraclea to view a lovely panorama of the whole city with its gardens, *boulevards,* bridges, churches, *bazars,* mosques, &c., spread out as a carpet. Dinner with Dr. Teláfus the hydropathist. An hour with Dr. Rédde, the intelligent naturalist, listening with wonder to his varied experiences.

The one thought above all was whether my request would be granted? Perhaps my name brought me luck for on the third day when at a late breakfast, General Sheremetieff's secretary called and informed me with the General's compliments that permission had been received for my visit to the Trans-Caspian railway and that the necessary arrangements for my trip would soon be perfected.

In the interval I paid two or three visits to the railway depôt which is in charge of M. Berezowski, a Pole. The railway working of the Surame inclines on the road to Batoum was also inspected chiefly for the information of Sir A. M. Rendel in connection with the inclines on our Indian frontier. A full report on this section has been submitted separately to the Government of India.

On my return from Surame and Tsepa I was introduced to Lieut. Vasilii Michailovich Tamamsheff, A. D. C. to Prince Dundakoff, who was to accompany me to Bokhara.

He is an Armenian, a fine looking young man with black hair and black eyes. He belongs to the Mingrelsky regiment and wears a medal for the last Turkish campaign. Farewell visits were paid to Prince Dundakoff Korsakoff, the Governor General of the Caucasus and of Trans-Caspia, to General Sheremetieff, to M. Berezowski and his bride and to others. At the station there was quite a little coterie to see us off. We arrived at Baku safely but four hours late as the line had been partly washed away by heavy floods near Adji Kaboule.

Baku.—Baku is very dirty. It has 60,000 inhabitants, possesses 150 refineries, and manufactures 200 million gallons of lamp oil yearly. The naptha springs are at Sabuntschi and Balakhaneh and can be reached in a drive from Baku. There is an account given in Maccabees of an enquiry by the King of Persia (*Cir.* 144 B. C.) from the priests regarding the fire that was hid in the pit and which was no fire but thick water. Neemias the envoy called this thing 'naphthar' while others called it 'nephi'.

At Surachani, about midway, lime burning by naptha gas was going on by the road side. Mere heaps of limestone calcining by the gas from the ground lighted with an ordinary match.

A separate account of the naptha wells and of the process of distillation at Nobel's works has been submitted to the Government of India. I need not trouble you with the details, but during the second half year of 1888, 12 English steamers conveyed 8¼ millions of gallons of this oil to India. It had to pass over 560 miles of railway, charging 22½ shillings per ton, and then by steamer, paying freight and canal dues.

The out-turn of Nobel's factory alone was given to me at 225,000 tons a year with a capacity of working up to say roughly 120 special cylinder railway wagon loads per day.

The Caucasus country.—Before leaving Caucasia let me give you a short account of the country itself.

First, there is the range of mountains known as Caucasus running for 700 miles in a S. E. direction from one inland sea to another. To the north of this chain are the lands (Cis-Caucasus) drained by the Terek to the east into the Caspian and by the Kuban to the west into the Black Sea.

To the south of this great chain about 150 miles off is another range (Anti-Caucasus) whose southern slopes are drained into the same inland seas by the Arax to the east and by the Choruk to the west.

The valley between the ranges is called Trans-Caucasus. It is drained west and east by the Rion and the Koura, two rivers by which intercourse between Europe and Central Asia was formerly maintained.

The division of the Caucasus range into two parts by the depression through which the Georgian military road runs has already been described.

The mean height of the western section with Elburz (18,524) Kochtoutan (17,092) and Kasbek. (16,546) is greater than that of the eastern section where the highest point (Teboulos Mta) does not exceed 14,760 feet. Elburz was first ascended by Messrs. Freshfield, Moore and Tucker in 1868 with the assistance of a Chamounix guide, and in the autumn of last year two Russian gentlemen with a guide from Interlaken ascended both Elburz and Kasbek. The mean height of the Anti-Caucasus range does not exceed 10,000 feet, but Alagoz and Ararat rise to 13,735 and 16,925 feet respectively. Little Ararat is 11,797. The ascent of Ararat has been achieved by Parrot and Abich, and more recently by Professor Bryce, but there is still a deep rooted belief in Caucasia that Ararat cannot be climbed.

In spite of the height of its mountains, the number of snowy peaks of the Caucasus are relatively less than in the Alps while the limit of perpetual snow is nearly 2,000 feet higher than in the Pyrenees in the same latitude. The forest vegetation ascends to about the 7,000 feet level. Box, wild vine, fruit trees of all sorts growing in abundance on the lower slopes serve as an introduction to forests of walnut, maple, lime, ash, beech and chestnut trees, beyond which comes the birch, finally azaleas, rhododendrons and spurge laurels.

The fauna is very rich. Chamois and ibex on the hills; bison (*aurochs*) in the Elburz forests; bears, wolves, wild boars, stags, &c., on the lower slopes; gazelles, hyenas, jackals and leopards in the plains of the lower Koura; eagles, vultures and other birds of prey on the higher plateaux. Pheasants originally of the Caucasus are still plentiful in the coppices, with waterfowl in profusion on the wet lands. Of reptiles, serpents and scorpions are the most prominent.

Minerals.—Judging from the specimens in the museum at Tiflis there is not a mineral that does not exist in fair profusion in this favoured spot.

Language.—There is not another country in the world which presents such a collection of races and people. They are all subject to Russia apparently without a murmur. The Arabs call it the "Mountain of Tongues." Pliny gives 130 and Strabo fixes at 70 the tongues and dialects of these districts.

Population.—The population numbers about 6½ millions. There are the three aboriginal races, *viz.*, Adighes ~~202,000~~; Kaztevels 1,150,000; and Lezghiens, 1,050,000. To these may be added Indo-Europeans 1,500,000; Iranians 105,000; Turco-Tartars 1,330,000. The balance 252,853 may be taken to represent the army and other residents. The army of the Caucasus on a war footing is estimated at 250,000 men and 300 guns.

The most celebrated of the Adighes are the Circassians. They were finally conquered in 1864 and in obedience to a summons to quit their valleys "within one month under penalty of being treated as prisoners of war," four-fifths of the population or more than 400,000 people endured expatriation while the remainder turned to robbery and murder across the Turkish border.

Of the Kaztevel race the principal are the Georgians or Grousiens (1,150,000), descendants of the ancient Iberians and divided into several groups. Georgia was ceded to Russia by its last prince in 1799.

The third aboriginal family includes the Lezghiens and the Avars. The Lezghiens proper to the number of 560,000 frequent the south of Daghestan, the valleys of the Alazan and of the lower Koura, professing Sunnite Muhammadanism and are to be compared with the Wahabis of Central Arabia.

The Avars (340,000) originally the terror of Italy and Byzantium dwell to the north of Daghestan. To this tribe did Schamyl belong and if we had sent an army into the Caucasus at the fall of Sebastopol, he was counted on as our ally.

Schamyl after resisting for 25 years the inroads into his highlands was at last driven early in 1859 to his stronghold of Gounib. After a blockade of some months the fortress, on the night of September 6th, was carried by escalade and the chief of the Avars feeling all was lost, took the oath of allegiance to the Czar. Some of his relatives and people took service with Russia but the old man after detention at Kalouga, retired to Mecca where he died blind at eighty years of age.

Alikanoff the present Governor of Merv is an Avar.

The Indo-Europeans, 1½ millions, classed as conquering Slavs are represented by certain colonies of Greeks, Bulgarians and Germans.

Of the Iranian stock first come the Ossetes (110,000) living in the central part of the Grand Caucasus. They are polygamous and make offerings upon rude stone altars; some are Musalmans, others are fire worshippers.

Next come the Armenians or Haikans (720,000) a people well instructed, steadfast in religion and strong in the memory of national traditions.

Thirdly are the Persians (120,000) distributed as Tates, Tatiches, Tajiks, Taliches, &c., annexed in 1828; they people the province of Astara and Lenkoran.

Fourthly the Kurds (10,000), nomads living about Erivan and the slopes of Ararat, whose pleasure it is to sack Armenian and Persian villages beyond the frontier.

Lastly the Turco-Tartar race (1⅓ millions) dwelling principally by the Koura and the Arax. Some Tartar nomad tribes wander also in the Moghan steppes; others in Daghestan, upon the shores of the Caspian and in the Elburz valleys. They speak the Turkish dialect of Azerbeidjan and are mostly work people, poor, sober and forbearing. Sunnis and Shias live together with a good understanding, the reverse of that which obtains in Persia.

Dress.—As regards dress, this naturally varies with the class. The Georgians, Circassians and Lezghiens all wear the sheep skin cap, the long coat tight to the figure, with belt, sword and pistol and the cartouche case sewn on to the breast flaps, with blue pantaloons and long boots. The women wear round flat velvet hats ornamented, and a white veil behind, their hair in long curls enclosing the face; a short open jacket covering an embroidered waistcoat and a skirt of either blue or violet stuff over a a crinoline. Their features are prominent and the far famed beauty of Circassia lacks the softness and the delicacy which one has always fancied it to possess.

The Armenians for the most part wear a blue blouse not unlike a butcher's at home, loose trousers and an ordinary schoolboy cap made of silk.

The poor labourers among the Tartar class are swathed and tied up in clothes of coarse material and generally wear the round felt skull cap of the Persians.

The Persians are as of old, with their hair and fingers dyed deep red with the leaves of henna.

The Russian officers are all clad in cloth; they are always in uniform, apparently drive everywhere in carriages and never cease to wear their large military cloaks even in the hottest weather.

Paradise.—The Caucasus has also a separate interest, for in it some authors have placed the situation of Paradise, at the foot of Ararat which is often translated as Armenia. All we know is that it was a garden eastward in Eden and that a river went out of it and "became into four heads." From the well-known names of the Hiddekel or Tigris and the Euphrates others determine that this garden was situated in or near Mesopotamia. It is supposed that the Tigris and Euphrates met and flowed through the garden and that below it the rivers parted again into two streams called Pison and Gihon.

There is a third site much nearer to us here. The first river Pison "which compasseth the whole land of Havilah where there is gold, bdellium and the onyx stone" is the Kabul river flowing into the Indus at Attock. The second river Gihon "which compassed the whole land of Ethiopia" is the Oxus. The third is Hiddekel "which goeth towards the east of Assyria" and the fourth river is Euphrates or in this case the Helmand rising to the north of Kabul and flowing into the Seistan lake or sea of Tarrah. Mount Ararat being no other than the Takht-i-Suliman, nearer Draband on the Indus west of Dera Ismail Khan.

The trip so far had been a success. Twenty-three days had passed since I left England out of which 12 were spent in the Caucasus. I obtained what I wanted within three days of asking for it and now I am about to cross the Caspian with a young Russian officer as a companion to smooth my way.

As far as I can learn permission to visit the Trans-Caspian railway has never before been granted to any Englishman, official or otherwise and naturally I am pleased in being the recipient of such friendly treatment.

THE CASPIAN SEA.

Steamer Service.—At present Baku is the principal port of the Caspian sea, for not only is it the eastern terminus of the Trans-Caucasus railway but it is also a calling station for all trading steamers. A submarine cable is laid from Cape Apsheron to Fort Krasnovodsk.

The largest steamboat company, the Caucase-Mercurie, maintains a regular postal service between Astrakhan, Enselli and Meshedessa and receives a subsidy of 1½ *roubles* for every mile it carries the mails. It works the following lines from Astrakhan *viz.*, the Meshedessa, Krasnovodsk-Michailovsk, Enselli, Baku, and Alexandrofsk lines.

In connection with its Caspian service the Caucase-Mercurie maintains a regular service on the Volga.

Steamers of other companies also are running on the routes above indicated and some of the boats of smaller tonnage which work southwards from Baku are under Persian commanders. A very considerable trade is maintained by sailing vessels from port to port in every direction. Nobel

Commission are adopted, and the Indian army is divided into four army corps, it will probably be found most convenient to place auxiliary force staff officers on the staff of each army corps as well as on that of the Commander-in-Chief. With these staff officers, in communication with the military district staff, it will rest to arrange and determine in detail how, in the event of their being required to do so, the auxiliary forces within each district or army corps shall support or relieve the regular troops.

It is impossible to go thoroughly into the subject here; to say what bridges, what stations, and fortified points, what railway stations, railway and road centres, &c., the auxiliary men should hold. To do this requires an intimate knowledge of India such as no single individual can aspire to, and matters of this nature can be dealt with satisfactorily only on the spot. It would be of no value to offer suggestions.

The matters to which I have ventured to direct attention have a general bearing. Briefly recapitulated they are; bring your auxiliary forces to the highest practicable point of efficiency, and secondly, provide a machinery which shall guide their energy to the greatest profit. Having done so, we may confidently count upon possessing in our hands a reliable substitute for a portion of the regular army, and a leading element in maintaining the integrity of our Indian empire.

The railway runs south-east from Usanada, along the foot of the northern slopes of the Little Balkan to Kasandjik (116 miles), of the Kuren Dagh to Kizil Arvat (162), and of the Kopet Dagh to Geok Tepe (271) and Askabad (299). It then follows the foot of Daragez to Dushak (405), whence it turns to the north of east across the Tejend and the Murghab to Merv (513), and so through Repetek and Chardjui to the left bank of the Oxus (665½ miles). Bokhara is 750 miles and Samarkand 900 miles from Usanada.

The journey from Usanada to the Oxus, 665½ miles, takes 53½ hours. The stoppages amount to 11 hours and the running speed is nearly 16 miles an hour. The mail from Bombay to Jubbulpore runs at 26½ miles an hour.

The embankments are low and but little waterway is provided for. The earthwork may be defined as sand, varying from the salt moist particles near Usanada, through the pulverised dust of the oases, to the fine dry shifting sands of Repetek. From this it is not to be understood that the whole area traversed is profitless for it is more than probable that as the water supply is developed in the hills the country between Kasandjik and Pavnina, extending over 450 miles, will be brought under cultivation on both sides of the line.

The gauge is 5 feet. The rails are of steel, flat-footed, weighing about 60 lbs. to the yard, and spiked to half round and squared sleepers of fir and oak. The materials are all from Russia. There are but few bridges; those existing are well constructed of spars from the Volga.

The stations are good. These and the subsidiary buildings are substantially built of brick or stone. Reversing is done by triangles and at every station the sidings are sufficiently long to allow trains of 50 wagons to pass each other.

The first sweet water is at Kasandjik, 116 miles from Usanada. Many of the stations have fountains playing and the supply can be increased. General Annenkoff told me that the question of water supply has been satisfactorily settled and that in most cases he had led water from the hills in open drains. Between Kizil Arvat and Bagarden the water is led from the mountains for 5 or 6 miles in pipes. The Tejend feeds Geoksyor and Djudjuklu. Merv is on the Murghab, 150 miles further on is the Oxus, while Bokhara and Samarkand are fully supplied by the Zarafshan. Briefly, there is scanty water for 162 miles from Asunada to Kizil Arvat but for the next 250 miles there is water sufficient owing to the oases of Akhal Teke and of Atek as far as Dushak. The water from the several rivers can be carried and stored where required at intermediate points and in fact this is what is being done and about to be done in India on the line south of the Sutlej between Rajpura and Bhawalpur. There can be no doubt but that all stations will soon be fully supplied. The water is there, if not, how can there be "Clouds in the East." ?

Petroleum from Baku is at present used as fuel. There are naptha springs at Bala Ishem where the yield is about 63 tons a day and the supply in Cheleken Island has not yet been developed. A further supply will also be found probably near the Oxus.

Of rolling stock there is an abundance. I did not count the wagons or vehicles. Several spare wagons were seen standing on the sidings at many of the stations, covered goods capable of carrying 40 soldiers or 8 horses apiece, and platform trucks to carry guns or 60 bales of wool each. Numbers of wagon stock ready built, were being landed in pieces from steamers.

The management is entirely military, officers are in charge of the stations and an officer examines your ticket in the train; the drivers, guards, brakesmen, pointsmen, telegraphists, watchmen, gangers, &c., are of the railway battalions, and a military officer, Lieut.-General Anneukoff, has supreme control.

The possession by Russia of hills flanking the railway for about 250 miles is a wise precaution for it reduces to a minimum the chance of the railway being cut by any hostile operation. Moreover Russia in addition has secured the right to enter Persian territory whenever necessary.

Geok Tepe.—The fort of Geok Tepe is in ruins, irregular in shape and about 4 miles in circuit. Mudworks with a profile 18 feet thick, 10 feet high with a wall 12 feet in front, and a ditch 9 feet wide and 4 feet deep. The whole area is now overgrown with camel thorn. The fort is close to the railway and standing on the parapets it is not possible to realise that here 14,000 Turkomans with their match-locks and swords and one old gun (taken from the Persians) opposed the Russians and their 70 pieces of artillery for at least a month. Forty thousand, including families, were encamped within the fort.

The Turkomans made three sallies always between the setting sun and the rising moon, when darkness was most intense. In all hand to hand encounters the Turkomans had the best of it and at last the Cossacks scarcely liked to face them. However the big guns and rifles did their work. The mines were exploded, assaults were made at several points at once, and the defenders fled. Seven thousand bodies were found in the fort and the fugitives who were not caught, or massacred, made their way to Tejend. The "Turkoman barrier" was entirely removed and swept away. The Russian force was small and split up into detachments, 1,000 were left at Bami, 1,000 were sick, and not more than 4,000 were actually engaged. The lines of attack extended for 5 miles.

Askabad.—At Askabad I breakfasted with General Komaroff and spent some hours with him, his daughter and his son. Madame Komaroff and two daughters had gone on to Merv the previous night. Breakfast was served at noon. Colonel Andrejeff and Captain Komaroff were also of the party. The usual "zacouska" consisted of tongues, sardines, anchovies, &c. and eau-de-vie, to be followed by "borschi" a thick Russian soup, beef, potatoes, and brinjalls, fowls and grapes, cauliflower and cheese, fruit and water-melons, Kahetie wine, Russian beer, and Nalifka liqueur with coffee. The afternoon was spent in examining collections of bronzes, coins, old ornaments, photographs, &c. The general explained to me how troops got Panjdeh boils, which affected the young more than the old soldier, and that once having suffered there was no second attack. The model of a soldier's foot showed a nasty red spot. Askabad was not unhealthy though at first it was so and there were certain localities, *viz.*, Krasnovodsk Tchikislar, and Sarakhs, where good health prevailed. The Russians do not care for ice, they think it unhealthy and that it induces fever, The general had been here for five years. Merv has a bad fly and camels cannot stay there in winter. Snow falls in Askabad for two months in the year when sledges have to be used. The bulk of the troops were up in the hills, probably at work on the road to Kuchan near the head of the Atrek valley. Its extension to Mashad has to be done by the Shah.

From Dushak it is about 90 miles to old Sarakhs, and about 66 more will take you to Zulficar the extremity at present of the "Turkoman wedge" about 100 miles from Herat, and no Paropamisus difficulty to intervene. The direct line from Merv up the Murghab to Herat would be 230 miles.

Merv.—At Merv I was invited by Colonel Alikanoff, the Governor, to dinner. The party consisted altogether of about twenty, seven of whom were ladies. Alikanoff is a fair-faced man with rather red hair and a heavy beard, physically strong and rather determined in manner. He wore his two crosses of St. George, one gained as a private, the other as an officer. Alikanoff shewed himself to be most attentive and agreeable.

The Governor's house and many others are in the fort. The fort is irregular and about 2 miles long. It is now overgrown with camel thorn and the railway runs through it. The old ramparts of mud are now broken down. Their section must have been 20′ high with a terreplein of 40 feet widening to 70 feet at the base, with ditches both on the inside and the outside.

The markets are also held in the fort. There were a number of Tekes riding and walking about besides those selling and hawking goods. Pheasants were selling at *5d.* a piece, a fine one alive at one shilling and eight pence. The most important characteristic of this fine bird and one that distinguishes it from all other pheasants hitherto naturalized in England is that the greater part of the wing is white. It has been called *P. principalis* in commemoration of the fact that the skins were first brought to England for H. R. H. the Prince of Wales. The living specimens in the Zoological Gardens, Regent's Park, were obtained by Major Peacocke from Bala Murghab at the request of Sir Peter Lumsden. The Turkoman wears a huge sheepskin hat as big as a grenadier's bearskin, otherwise he is dressed much as a Sindi. The large sheepskin caps cost from 7½ pence. Silver ornaments were freely offered. Large leather shoes priced at a *rouble*. Tea, raisins, drugs, iron, skins, mats, sugar, tobacco, dried fruits, metal, water bottles, chintzes, carpets, &c.

Business was conducted very much as it is in the fairs in India and differs pretty considerably from the practice when Conolly was at this market in 1840. It was then full of slaves of both sexes and all ages exposed for sale and intending purchasers were going about from one group to another "handling them like cattle." For my part I was in mufti and had not even a walking stick in my hand.

Bairam Ali, or old Merv, is 14 miles away. A fair account with good illustrations has been given by Boulangier in 'LeTour du Monde.'

Shifting sands.—At Pavnina the sand begins and it may be said to extend for 90 miles to Chardjui. The portion between Peski and Barghany extending for 50 miles is known as "the shifting sands of Repetek." The extent to which drift takes place may be gathered from the fact that 40,000

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MAJOR-GENERAL SIR JAMES BROWNE, K. C. S. I., C. B., R. E.,
Quarter-Master General in India, in the Chair.

A TRIP TO BOKHARA.

BY COLONEL A. LEMESSURIER, C. I. E., R. E.

The Chairman, in introducing the lecturer, said that if the railway to Bokhara had done nothing else it had at all events caused a much livelier interest among Englishmen than existed before on the subject of Central Asia. He introduced Colonel LeMessurier to them as a railway engineer who was specially qualified to deal with the subject of the new Russian line to Bokhara.

I appear before you at the request of my friend Captain Mason, the Secretary of this Institution. Colonel Maitland, most kindly connected me with the excellent lectures on the Russo-Afghan frontier which had been delivered by Major Barrow and himself* but I would ask you to remember that my visit to Central Asia was quite unofficial, and without the support or knowledge of Government.

It was performed in the private capacity of an officer returning from furlough to his duty in India and with only such information at his disposal as is available to the public.

The story I have to tell is therefore a very simple one. It will state in plain words, a part of what I have seen on my trip from London to Bokhara and if time permits, something of my ride through Persia to catch the Bombay steamer at Bushire.

Without dawdling over the preliminaries of packing let us imagine that a start has been made. The baggage consists of two Gladstone bags, a hand bag, a bundle of rugs, a canvas sack containing a saddle and bridle, or 5 articles weighing 121 lbs. all told.

From London to the foot of the Caucasus mountains the journey may be done easily in five stages.

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* These lectures have not been published.

yards square and 15 yards high. The cost of the whole was £50,000 or something less than £19,000 a mile. Considering the shifty nature of the river the structure was quite suited to the occasion. Parts have been damaged by the floods, but as far as I know the traffic has been satisfactorily transported by this crossing, steadily, since its opening in January 1888. I made a point of telegraphing from Calcutta to congratulate General Annenkoff on this splendid engineering feat.

Unopen Line.—We crossed the main stream of the river in a steam launch, *Peter*, manned by Cossacks, and then drove in a carriage with 3 horses to the east bank, crossing the smaller streams by ferry boat, horses, carriage and all. After a hearty breakfast at the Cossack outpost we started on horseback, a party of six, to cross the sands to Khoja Daulat, (17 miles), the guide (djiggit) furnished by the Beg of Chardjui, myself, Tamamsheff, Osip the servant, and two Cossack soldiers.

The moving sand is soon reached and here, following the guide at a walk, the order is single file over and around the crests of the different knolls, a veritable sea of sand. The air is thick with the finest sand; camels at 100 yards off are quite indistinct. The track is rapidly obliterated and with no points to steer by there is every chance of missing the caravanserai at the far side.

At Khoja Daulat we got a 'drogi', a small low carriage without springs drawn by three horses, and reached Elyat by 8 P. M., where one of the Beg's subordinates took us in, provided dinner and a clean room to sleep in. At Karakol we drove to the house of the Beg—a fine old man, short, stout, florid, and dressed in a coat of Bokhara silk in many colors with a white turban. He was most polite and produced his hawks. We left Karakol in a heavy dust storm blowing from the north, the air being much like a silver fog. More tea and refreshments at Ek-i-tut and towards evening the carriage (after a break down) passes through the western (Imam) gate and we enter the city of Bokhara. In half an hour more we are within the precincts of the Russian embassy, comfortably settled in one of the rooms kept ready for travellers.

Railway work.—As the railway between the Oxus and Bokhara was under construction at the time of my visit. I may here appropriately insert a few words about the Russian method of distributing work.

In making the railway, the earth-work, &c., up to formation is done by local labor under petty contractors who work up to a schedule of rates. The ordinary rate for earth-work is 2⅝ pence per cubic yard. A Russian laborer would earn half a crown a day. The Persians and Tekes about seven pence each and the Bokhariots from five to six pence daily.

In laying the permanent way, military battalions are employed. As soon as the earth-work is ready, Decauville tram rails are laid ahead. The sleepers and small stores are all carried forward by the tram and every thing is then put into its proper place by local labor under the supervision of the military. Every sleeper has its spikes beside it, the fish bolts and nuts are at site, and the soldiers are also ready in their places. A 'material' train comes up to the head of the line and discharges its load of rails by a simple apparatus on to broad gauge trollies

The first stage is to Balta at the mouth of the pass and the second to Lars in the gorge. The start from Lars towards Kasbek is made with 4 horses in the wheel and three in the lead abreast with a post-boy on the off leader. The road is still in the gorge which narrows rapidly until it becomes a mere passage between high hills. The road hugs the sides, first on one bank, then on the other and in many places is cut out of rock where the strata are contorted in all directions, while mountains of *debris* block the river bed. It is from this part that the pass has been named Darial or "Narrow", and here tradition has placed the fortress from which Queen Tamara used to cast her lovers into the torrent below. Here also stood the *Castellum Cumania* which according to Pliny and Strabo defended the "gates", and on this spot the Russians have erected their own fort and called it Darial.

Kasbek is the chief scene of Lermontoff's 'Demon' the Russian Faust, a mixture of Paradise Lost and the book of Job, a beautiful poem ending, as with Marguerite, in the apotheosis of Tamara the heroine.

At Kobi the sleighs for use in winter were all stacked under sheds.

The summit is called the 'Mountain of the Cross' from a cross planted here in 1824 by General Yermontoff "in token of the domination of Holy Russia."

One may pause here a moment. It is probably the point where the traveller leaves Europe and enters Asia.

The Hessours a tribe about 7,000 strong dwell on the slopes of these mountains near the pass. They say they are "descendants of the Cross"; although Christians by profession they eschew fowls and pork, they offer sacrifices like the people in Coorg to the spirits, they observe Friday, they wear coats of mail and their robes are covered with either black or red crosses.

Three of the leaders and two of the wheelers are taken off the coach before the descent to Gudaour.

The descent from Gudaour to Mlete (about 3,000 feet in 11 miles) is without doubt admirably accomplished and it is this piece of engineering particularly which it is said has gained for this road the credit of being the finest work of its sort in the world. The road is carried on high masonry revetments in long lengths along the steep mountain side which has almost a perpendicular fall into the ravine below. The work is undoubtedly good but I do not think the Georgian military road is superior (certainly not as far as its upkeep goes) to the existing road made by the French from Beyrout across the Lebanons to Damascus, or to the old road across the St. Gotthard, or nearer to us here to the roads up the Bhore and Tal Ghats in Western India.

Ananour contains one of the archæological curiosities of the Caucasus, *viz.*, the fortified monastery of St. Khitobel.

At Mtszkhet the solitude of the mountains has merged into the busier life of the plains. On the river Koura huge rafts of 20 big trees are being floated off and beyond it runs the railway with the Anglo-Indian telegraph wires. This place, the ancient capital of Georgia, is said to be the oldest town in the world, Damascus not excepted. Its church possesses the rare relics of a shirt worn by Noah and our Saviour's seamless robe. The whole landscape approaching Tiflis is not unlike what and the average was 15 miles, with full siding accommodation for the longest train at all stations, and ample spare siding at the more important points. The approximate number of railway carriages and wagons for a complete army corps of the strength already given would be 3,420 or 63 trains of 50 vehicles each. Allow a margin and make it 100 trains of 40 vehicles each (they constantly run 55). If we take 20 miles an hour (the through rate at present from Tiflis to Baku) the run from the Caspian to Chardjui will take 33 hours, and with as moderate a discharge as 12 trains a day at the terminus (with a fortnight's notice I believe they could run 20 trains a day each way within the 24 hours) the transport of an army corps from the Caspian to the Oxus would be complete within 33 hours + eight days + eight hours, or say in all 10 days.

Monopoly of Trade.—The construction of this railway has completely altered all the conditions of the Central Asian question and practically it has secured to Russia the monopoly of trade in the regions traversed. It crosses the Oxus, tapping the resources of Kunduz on one side and Khiva on the other, to the gates of Bokhara, a centre of Muhammadan fanatacism and the capital of the Central Asian world.

It may be that Russia is now gaining her India in Central Asia, but will she stop to develop it? Will her ambition be satisfied in reproducing the material benefits, in refounding cities and in restoring civilisation to whole regions of territory which for so long have remained absolutely desolate? Whatever may happen in the future this much must be apparent to all, that coming eastward there is a humanizing force at work which never rests, and with it Russia is developing a power which in a very short time will become truly formidable.

Bokhara.—Now let me say a few words on Bokhara. Monsieur Klem, the secretary in charge of the embassy, called and invited us to be his guests during our stay.

Our first visit was to the *bazar*. The streets were full of people and the square was crowded, for a man was about to be publicly executed in front of the Amir's palace.

I imagine I am the first Englishman (excepting Lansdell in 1882) who has been permitted to enter this city since Dr. Wolff left it in 1844 and it is odd that my first experience here should be an execution, for to Englishmen Bokhara must always stand connected with the murders of Stoddart and Conolly. How far back all these things seem to be! and yet it is not so, for although I never knew "Bokhara Burnes," still I knew his elder brother James, with whose sons I was at school and one of whom entered the Royal Engineers.

Colonel Stoddart was in 1835 attached as Military Secretary to Ellis's Persian mission. He went to Herat and in 1838 Sir John McNeill sent him from Persia to Bokhara. On his arrival Stoddart appears to have acted incautiously, for he knocked the Master of Ceremonies down and entered the presence of the Amir alone and unattended. Four days after this, he was confined in the Siah Chah, or Black Well, a dungeon swarming with every disgusting species of vermin. He was for 3 years without being able to hear or give any news.

Captain Arthur Conolly of the Indian Cavalry set out from Kabul in September 1840. He went to Khiva and thence to Khokand. Through

Stoddart he obtained permission to visit Bokhara and arrived there with Abdul Samut Khan on the 9th November 1841. He and Stoddart lived together in comparative comfort on an allowance of 30 shillings a day till the beginning of December, when the news of the Kabul disaster arrived. They were then imprisoned, this making the fourth term of confinement suffered by Stoddart.

From Conolly's letters and entries in his Prayer Book we have records of the days these two officers passed in prison "in the clothes they had worn for 115 days and nights, with heads and beards uncombed for 5 months."

Throughout the city on all the minarets and mosques, storks build their nests. The most important structure is the Minar-i-Kalan, a lofty minaret in the middle of the city. Sometimes a criminal is thrown from the top. Russian paper *roubles* are current everywhere and there are rows of *shroffs* in the *bazar* dealing apparently in rolls of this money. There is a local currency in silver and copper but *kopecks* are readily taken. One *shroff* said paper had a higher value than metal because he could send it away.

The walls of the fort are 7 miles round and in it there are 11 gates. The profile is about 30 feet high and, like those of Kandahar, built of well trodden clay.

Bokhariot troops.—There are no Russian troops in Bokhara and Bokhara pays no subsidy to Russia. The Amir has 25,000 troops and about 4,000 of these are in Bokhara. They are clad like Russians, artillery in green; infantry in red; cavalry in white. I witnessed a Sunday parade just outside the Samarkand gate. The parade ground was pretty well filled by the troops manœuvring. The movements during ¾ of an hour when once begun were continued to the end without a halt, promptly, smartly and without any noise or fuss. The officer commanding the parade stood on one side with his buglers and immediately a bugle sounded, the company commanders repeated the orders in Russian without hesitation. Moreover the men seemed to understand the bugle and if there was a doubt or hesitation among the rank and file, it was soon removed by the cane of the drill instructors. The officers judging by their colour and dress were all Bokhariots or perhaps more correctly, natives of Central Asia, while the soldiers themselves were dark-skinned men, hard, rough and ready. Parade being over the dispersion was immediate. The bulk of the men vanished, in many instances rifles were handed over to women while the soldiers two and two on donkeys set off for the *bazar* or their homes. Next to the great energy evinced by the Russian engineers in railway construction, under great difficulties, nothing surprised me more than the state of discipline and drill which these Bokhariot troops possess. To call them "native levies" would convey an altogether wrong idea. They may be rough, unkempt and perhaps indifferently armed, but the material is excellent and its capacity for hard campaigning absolutely beyond a doubt.

The army of Bokhara is even now an important factor. It must not be ignored. We have nothing to compare with it in India (outside our native army) either in quality or number, and if Russia continues to develop similar contingents of fighting men from other warlike states within her borders she will possess a power of aggravation and attack which pass the limits of description.

Trade with India.—The only merchandise Bokhara sends to India is about 150 camel loads of raw silk.

India sends to Bokhara 1,200 tons of tea, nearly 300 tons of indigo, 700 pieces of Dacca muslin, 13 tons of drugs, 250 shawls from Lahore, 50 Kashmir shawls and 300 pieces of *kinkhab.*

At the embassy I was fortunate to meet Dr. Heyfelder who was with Skoboleff at Geok Tepe. He is now busily engaged in testing the water for "reshta" or guinea worm.

Opinions.—In reading Kaye's "Lives of Indian Officers" it is interesting to note the opinions which were expressed some 45 years ago regarding the antagonism of England and Russia in Central Asia. Although Burnes "somewhat exaggerated the aggressive designs of Russia he was logically right in contending that our best policy was to strengthen ourselves in Afghanistan and not to endeavour to oppose by arms or to baffle by diplomacy the progress of the Muscovite in Central Asia."

Arthur Conolly and D'Arcy Todd however thought "less of Russian aggressiveness and more of Central Asian provocations."

In later years Colonel Saussermann contended that the action of Russia in Central Asia could not possibly have been retarded and that she had been driven on by circumstances in her seemingly aggressive march eastward.

Physical Geography.— Before leaving Trans-Caspia I must say a few words about the features of the country.

The Syr Daria or Jaxartes rises to the south of Lake Issikul. Its total length may be 1,450 miles. At present it enters Lake Aral. According to Strabo in the first century of our era, the mouth of the Jaxartes was in the Caspian (Dead Bay).

The Amu Daria or Jihon, or Oxus, has its source in Lake Victoria about 14,000 feet above the sea in the Pamir plateau. Its length is about 1,500 miles. It flows into Lake Aral but at one time its discharge was into the Caspian at Balkan Bay. The Oxus also in the 16th century flowed by the Uzboi, past the Igdi wells into the Caspian.

It is also supposed to have branched southward towards Kizil Arvat, then through the defile between the Kopet Dagh and the Kuren Dagh hills and so by the Atrek to the south-east corner of the Caspian.

The three basins of the Black Sea, the Caspian and the Aral were also at one time supposed to form a great fresh water inland sea which extended to the Persian mountains. The subsequent separation of the three basins being explained "by the rapture of the straits of the Bosphorus which there are grounds for attributing to a volcanic commotion at the mouth of this opening in the Black Sea and which caused the cataclysm about 1529 B. C. known as the "deluge of Deucalion." The arguments submitted by Major Herbert Wood, R. E., in his volume 'The Shores of Lake Aral' indicate "a very strong probability that the three basins of the Euxine, the Caspian, and the Aral could be connected again into an Asiatic Mediterranean which would pass its surplus water to the north, merely by closing the Bosphorus to a height of 220 feet."

If the closure was made, the waters of the Black Sea would escape by the Manytsch into the Caspian and after having filled it up would pass by the valley of the Emba to Lake Aral and from Balkan Bay by the Uzboi channel of the old Oxus. The eventual overflow of the Aral Sea proper passing north over a ridge near Fort Orsk and thence along the eastern foot of the Ural chain into the Frozen Ocean.

The Russians.—And now a word as to the Russians themselves. The mass of the people are naturally kind, ostensibly devout and strictly attentive to religious observances. They possess faith in and respect for their superiors. They love their Czar and believe him to be infallible. As regards the soldiers, the Russian officers believe that the Cossack is superior to the Sepoy both in discipline and powers of endurance. As regards the higher or more educated classes they are hospitable, vivacious and agreeable. Among the officers, there was an evident interest in their profession and a readiness to discuss subjects beyond the immediate sphere of their individual work. Moreover whenever public topics such as matters in Europe, the construction of the Siberian line, the partition of Afghanistan, the march on India, and such like were under discussion it always happened that one or two of the company would produce pocket atlases and emphasize their arguments by a direct reference to the maps. On leaving Russia for Persia my last farewell on the quay at Baku was in the embrace of a Russian officer in uniform, for Tamamsheff my companion for so many days had said "My dear Colonel! I must kiss you."

PERSIA.

Before leaving Baku I had to get rid of my Russian paper and also to change some sovereigns. An Armenian money changer exchanged the *rouble* paper for Persian silver *krans* at about 2 per cent. profit but he raised the rate to 4½ per cent for English money as he "did not want sovereigns in gold." I had missed the regular Persian steamer by one day and with luck I managed to secure a berth in a small steamer of 60 tons, the "Euphrate," bound for Resht under a Persian commander with a Persian crew and flying the Persian flag of the lion and sun.

After 45 hours of rolling we reached Enselli. Here is the garden tower five stories high, built for the Shah when he made his first trip to Europe. Major Wells, the Director of Telegraphs at Teheran had arranged that a young *mirza* (educated person) should meet me, and by midday I was quite at home in the Russian consulate at Resht. M. Vlassow, his wife and daughter have now gone to Meshed. My post office permit to travel was secured without difficulty and a Persian servant Nasr-ulla was engaged to accompany me across Persia.

It is nearly 1,000 miles across from the Caspian to the Persian Gulf. The general elevation of the country is about 5,000 feet above the sea with parts rising to as high as 8 and 9,000 feet, the ascent to and descent from this plateau being extremely abrupt. There are two modes of travelling, one "caravaning" by stages with mules, the other riding "chappar" on horse-back covering three or four stages during the day.

Chapparing.—In "chapparing" I took three horses, one for the "djiggit chappar" or guide who carried my bags, a second for the servant and provisions, the third, generally a shaky looking beast, but declared to be 'fast,' 'sure-footed,' and 'the pride of the stable' for myself.

Each one according to his weight and agility and the condition of the nag that carries him will progress differently. Anyhow for heavy men a ride of 50 miles on two nags from Teheran to Pik including a somersault, horse and all, near Robat Karim in 10 hours, is fair. Fifty-seven miles with a second fall near Sinsin on three nags in the same time is also fair, while 78 miles on four nags in 12 hours makes a fair average of 6½ miles an hour right through. The longest stage on one horse was 29 miles but there were others of 28, 27, 24, &c. For staging in any country these distances are too long.

The *chappa-khanas* or rest houses, vary in accommodation. Those on the Tabriz-Tehran road are excellent, others again on the line to Shiraz are 3rd, 4th and even 5th class.

The type is a walled enclosure in which the post horses are stabled, two rooms for the man in charge, and a room on the roof often without doors or windows for travellers. On arrival the first thing is to have the floor swept and cleaned, a fire lighted and the pot put on to boil. Put out the bed bag, fill it with *bhusa*, wash, put on your night suit and proceed to dine. A fowl, a cabbage, a handful of rice, and a square inch of Brand's soup just to thicken the gravy, with a spice of Hunger's condiment, makes a savoury dish. Some bread as thin and as large as a newspaper with a cup of tea completes the repast. To bed, under the rugs, well wrapped up in an ulster, ten minutes reading of Haji Baba, and you pass into the land of dreams till day-light wakes you to further exertion. In many cases however I was sheltered by the telegraph officials, of whom I still retain many pleasing recollections.

Kasvin is said to have been founded by Shapur the conqueror of Valerian. It is famous for its Masjid Djami, built by Harun-al-Rashid. To the north at the foot of Mount Syala are the ruins of the principal seat of the Assassins or Nabatheniens.

Teheran.—At Teheran I was taken care of by Major Wells and his wife. I was thus enabled to see much that otherwise I should have omitted and to make many acquaintances with Persian and European officials which under other circumstances could only have followed formal introductions.

Mr. Nicolson was officiating as British Minister at the time of my visit. He considered much that I told him to be sufficiently important for transmission by the first mail to England and to India.

Of course I was taken to most of the well-known sights, but what struck me chiefly was a garden of the Shah's, where he has a big palace for himself and 17 smaller ones for some of his wives and their families ranged in an arc round a lake. His grand-father had 700 wives and 600 children.

In the palace is the peacock throne taken from Delhi by Nadir Shah. The private treasury of the Shah is said to be in vaulted chambers under a large tank in one of the gardens. It is opened occasionally, once in three years, not for the purpose of taking money out, but always for putting more in.

A good deal has been written lately about the rivalry between England and Russia in Persia. It undoubtedly exists, and it may naturally be concluded that if certain advantages such as the opening of the river Karun to trade are secured by England from the south, corresponding concessions will be demanded by Russia from the north. My present impression is that Russia will connect Askabad, Kuchan and Mashad by rail. Its extension will then follow *viâ* Jumain and Karman to Bandar Abbas the long sought for outlet on the Persian gulf.

Government.—The Persian Government has no debt as the revenue of the year always exceeds the expenditure. The Shah farms out each province to a governor. Ghilan it was said had been let for the year for £7,500. It is also said that if the Shah is in need of funds for a special purpose that he enquires after the health of his governors. A sum of money is remitted in response and if that sum is not considered sufficient the enquiry is repeated.

Army.—The army is now being trained and drilled by Russian officers, as infantry, cavalry and artillery. The material is said to be good and although a great improvement has been made there is a want of certainty or finality about the whole arrangement owing to the irregularity with which pay is issued.

Temporary Marriage.—Temporary marriage is an institution peculiar to Persia and four conditions are indispensable, *viz.*

The contract, which must be drawn up before a priest.

The personal conditions, wherein the woman shall profess one of the four supposed religions.

The dowry, of which the husband must pay half if he breaks off the match before marriage, and the whole if he repents his action after marriage.

The period, for which the marriage may be agreed upon.

The characteristics of the nation are, pride in its traditions; an invincible faith (as Shias) in the memory of Ali and the Imams, with a corresponding hatred of the Sunnis and their Caliphs, Omar and Abu Bakr.

The Main Route.—Kum is famous for its pottery. It holds also the shrine of Fatima, so sacred that its altar affords protection to all who seek it.

Near Passangun I met Dr. Woolbert who was "caravaning" to Teheran to join Maclean at Mashad.

Kashan is famous for its silk and velvet. At Ispahan I received a most hearty welcome from Dr. Hoernle. Here I called on the Zil-es-Sultan, the Governor of Ispahan, and the eldest son of the Shah. I was shown over the arsenal by Karim Khan Amir Panj.

Near Murghab is the tomb of Cyrus.

South of Sivand is Naksh-i-Rustum, the tombs of the kings, in a high sandstone hill and near Puzeh is Persepolis and Naksh-i-Rajjub.

Between Persepolis and Zirgan is the Kur river immortalised by Moore in the nymph's song to Azim who had lost his Zelica, as "Bendemeer's stream."

Shiraz with its cypresses, gardens, town and mosque is below hills in a highly cultivated and well watered plain. From Shiraz the journey has to be continued with mules as the country is so steep and paths are so rough.

At Pirizan where St. John was attacked by a lion commences the descent of 7,000 feet to the sea.

At Borasjan I heard much of the Persian war from a native point of view. How at Kushab the Persian square was astonished to see a few horsemen charge it, and that when our officers got inside the square the Persians did not attempt to kill them but looked on and wondered what was going to happen next.

My last march was to Shif across slippery mud and in a downpour of rain. However on reaching the sea, the *bandobast* proved to be good for there was Colonel Ross's launch with steam up, ready to take me to Bushire with my English letters to the latest possible date on board.

The British India Steamer "Pemba," Captain Robertson, carried me to Muscat, Karachi and Bombay where before the anchor was dropped my Portuguese butler came on board. Although I lapsed without difficulty into the luxuries of an Indian life, yet I was able in one month to record in print the bulk of my observations and place them at the disposal of the Government of India. I now take this opportunity of acknowledging that in compiling that report (by no means an easy task) I owed much to the encouragement that I received both by word and by letter from H. R. H. the Duke of Connaught, the Commander-in-Chief of Bombay.

Conclusion.—The moral of my tale is this, let those who have health, time and means venture occasionally from beaten tracks.

The world is not at rest and there are forces at work which but few see and fewer still understand. "Mites" called men are not one whit less busy than the more lowly organized creatures in their influence for good or for evil. The result of their labor is not less wonderful. "Earth worms" in Europe are supposed by Darwin to have been engaged since the creation in the agricultural function of regenerating the soil ; while on the other hand, "white ants" according to Drummond's observations have been apparently commissioned, for some hidden purpose, to carry devastation into the forests of Central Africa. Can we in our finite knowledge pronounce upon man's work as advancing welfare or judge of it as leading to destruction ?

The essence of my reconnaissance is that during 85 days, the average progress was 100 miles a day at an average rate of 10 miles an hour and the cost (including the first outfit) £ 215.

On the motion of the Chairman a cordial vote of thanks was given to Colonel LeMessurier for his lecture.

many of the stations, covered goods capable of carrying 40 soldiers or 8 horses apiece, and platform trucks to carry guns or 60 bales of wool each. Numbers of wagon stock ready built, were being landed in pieces from steamers.

The management is entirely military, officers are in charge of the stations and an officer examines your ticket in the train; the drivers, guards, brakesmen, pointsmen, telegraphists, watchmen, gangers, &c., are of the railway battalions, and a military officer, Lieut.-General Annenkoff, has supreme control.

The possession by Russia of hills flanking the railway for about 250 miles is a wise precaution for it reduces to a minimum the chance of the railway being cut by any hostile operation. Moreover Russia in addition has secured the right to enter Persian territory whenever necessary.

Geok Tepe.—The fort of Geok Tepe is in ruins, irregular in shape and about 4 miles in circuit. Mudworks with a profile 18 feet thick, 10 feet high with a wall 12 feet in front, and a ditch 9 feet wide and 4 feet deep. The whole area is now overgrown with camel thorn. The fort is close to the railway and standing on the parapets it is not possible to realise that here 14,000 Turkomans with their match-locks and swords and one old gun (taken from the Persians) opposed the Russians and their 70 pieces of artillery for at least a month. Forty thousand, including families, were encamped within the fort.

The Turkomans made three sallies always between the setting sun and the rising moon, when darkness was most intense. In all hand to hand encounters the Turkomans had the best of it and at last the Cossacks scarcely liked to face them. However the big guns and rifles did their work. The mines were exploded, assaults were made at several points at once, and the defenders fled. Seven thousand bodies were found in the fort and the fugitives who were not caught, or massacred, made their way to Tejend. The "Turkoman barrier" was entirely removed and swept away. The Russian force was small and split up into detachments, 1,000 were left at Bami, 1,000 were sick, and not more than 4,000 were actually engaged. The lines of attack extended for 5 miles.

Askabad.—At Askabad I breakfasted with General Komaroff and spent some hours with him, his daughter and his son. Madame Komaroff and two daughters had gone on to Merv the previous night. Breakfast was served at noon. Colonel Andrejeff and Captain Komaroff were also of the party. The usual "zacouska" consisted of tongues, sardines, anchovies, &c. and eau-de-vie, to be followed by "borschi" a thick Russian soup, beef, potatoes, and brinjalls, fowls and grapes, cauliflower and cheese, fruit and water-melons, Kahetie wine, Russian beer, and Nalifka liqueur with coffee. The afternoon was spent in examining collections of bronzes, coins, old ornaments, photographs, &c. The general explained to me how troops got Panjdeh boils, which affected the young more than the old soldier, and that once having suffered there was no second attack. The model of a soldier's foot showed a nasty red spot. Askabad was not unhealthy though at first it was so and there were certain localities, *viz.*, Krasnovodsk Tchikislar, and Sarakhs, where good health prevailed. The Russians do not care for ice, they think it unhealthy and that it induces fever,

Tuesday, August 13, 1889.

Brigadier-General C. E. NAIRNE, C. B., R. A.

Inspector-General of Artillery, in the Chair.

THE AKA EXPEDITION.

By Colonel R. G. Woodthorpe, C. B., R. E.

Deputy Quarter-Master General, Intelligence Branch.

In the autumn of 1883 I received orders from the Government of India to make all arrangements for conducting the exploration of the most extreme north-east corner of Assam with a view to discover the different routes leading thence into China and the present state of the paths and passes. A good deal of the country to be explored is entirely uninhabited and barren and so we required a large number of carriers; indeed I have found in all my explorations in Assam that to be independent of the inhabitants for carriage is the surest pass-port to success, and enables us to do more work and lose less time than when at the mercy of hill tribes who object to become coolies and never turn up when wanted. Just before leaving my head-quarters in Shillong, the hill station and seat of Government in Assam, Mr. Lyall the Secretary to the Chief Commissioner, Mr. Elliott, informed me that a small tribe inhabiting the hills north of the Brahmaputra in the Tezpur district who had given us very little trouble for many years had raided into our territory carrying off two natives, British subjects, from a place in the plains near the foot of their hills, called Balipara, where there is a Government rubber plantation and where the forest officer, Mr. J. Campbell, had his residence.

Mr. Lyall also mentioned the probability of an expedition being sent to recover the captives, and I therefore telegraphed to the Chief Commissioner to ask him if it would not be desirable for my party to go with this expedition if it was decided on, rather than proceed with my original programme, as that could always be carried out, whereas we had no knowledge whatever of the Aka hills and such an opportunity as the present might not again occur. I left Shillong on the 18th November for Gauhati where we were to proceed by river steamer up the Brahmaputra. My party consisted of myself, Messrs. Ogle and Ewing my civil assistants, two native surveyors, a writer, 60 *klassis* or instrument carriers, and 150 Khasia coolies, (men from the hills around Shillong), and I was to be joined further on by 100 more coolies from other parts of Assam. I had also with me six elephants which were permanently attached to my party.

Khasias certainly make the best porters for the hills on that frontier. They are strong, hardy, cheerful, easily contented, and can carry a load of 60 lbs. in addition to their own little belongings, generally, in all,

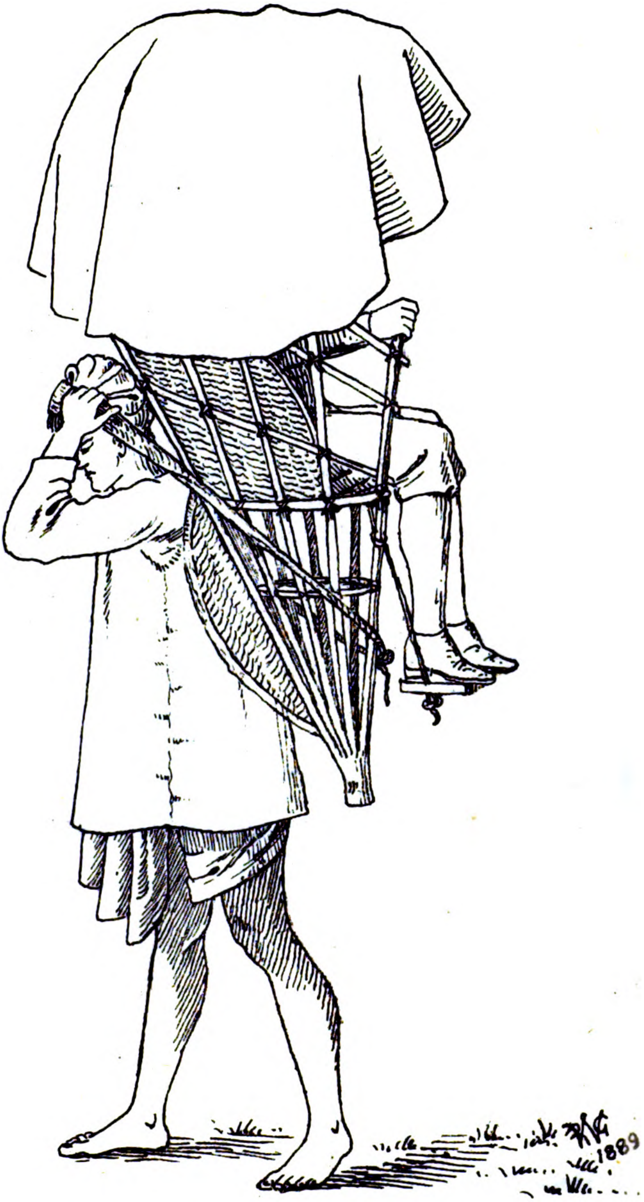
over 70 lbs. We had one man once with a great appetite, who was never satisfied with the ordinary coolie ration of 2 lbs. of rice daily, but wanted twice that amount: he was told that if he had two men's rations he must carry two men's loads, and this he willingly agreed to do, and did. They carry their load suspended by a band from the forehead, and this leaves their hands and arms free; a great thing when the road, as frequently happens, lies over or round steep faces of rock, with very little foothold, the chief support being obtained from canes and creepers, which the men clutch as they pass along. The Khasias have a peculiar kind of chair which they use for carrying people in, and which we adopted with great advantage for the transport of sick and wounded men. It consists of a stout bamboo, about five feet long, which is split up for about two-thirds of its length, (see Fig. 1). The split part is then opened out so as to form a funnel, into the bottom of which is worked a seat; half of the split portions are then cut away, and the rest are worked with cane into a comfortable back to the seat; a small foot-rest is suspended from the seat; and when one is accustomed to it, it is not at all an uncomfortable mode of conveyance. I was once carried thus by two men, turn and turn about, for six weeks in the Naga hills having sprained my ankle badly.

The rest of my party started to march from Shillong to Gauhati, a few days before I did, as I had work in Shillong and being able to arrange for ponies, intended to ride through in one day a distance of 65 miles. The ponies we have in Assam are of the Manipuri breed and though seldom over 12 hands are exceedingly strong and hardy and with a fair turn of speed for their size. On this occasion I had six ponies. I ought to have had seven, but one went astray at one stage and I had to walk 9 miles of the way, nevertheless I got through my 65 miles in 6¾ hours, two of my own ponies carrying me in the last 16 miles in the dark in one hour and 10 minutes. At Gauhati we embarked on board one of the fine steamers of the River steamer company and reached Tezpur on the 23rd November. There I found Mr. Elliott, who requested me to disembark my party till he received definite orders from the Government of India, as he fully expected sanction for the expedition: and Tezpur was to be the base of operations, (see Skeleton Map).

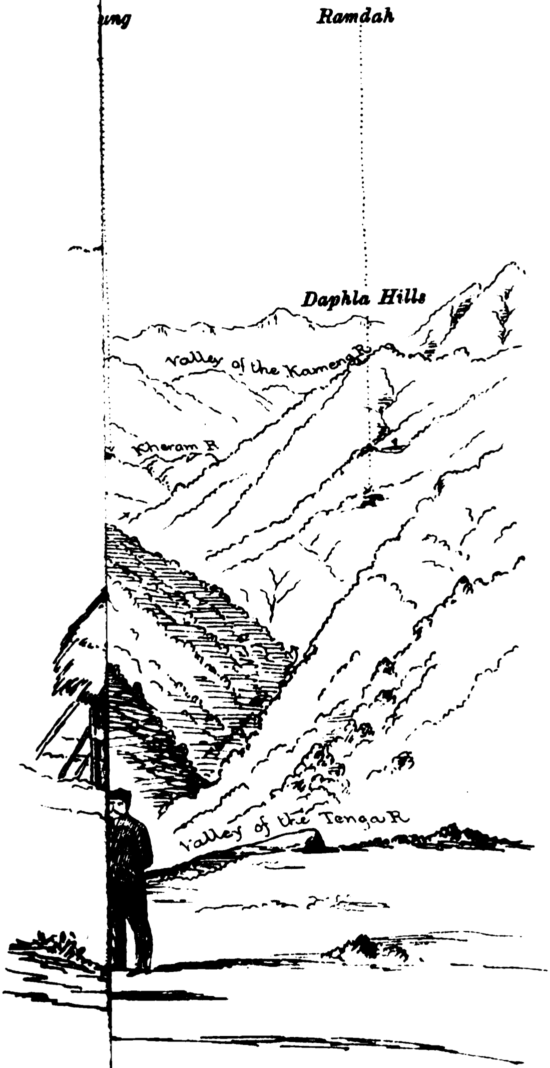
And here it may be as well, while awaiting these orders, briefly to give an account of the Aka hills, the Akas themselves, and the causes which led to the raid.

The Aka country, (see Sketch Map), is a small portion of the great Himalayan range of mountains forming the northern boundary of the province of Assam and lies immediately to the north of the British station of Tezpur, the seat of a Deputy Commissioner. The country consists, as we shall see, of a series of more or less parallel mountain ranges, steep and high, densely clothed with tall forest trees, with thick undergrowth of long grass, cane and scrub jungle. Among these ranges winds the Bhoreli river, rising among the lofty snowy peaks (23,000 feet above sea level) to the north, and receiving many important tributaries from the Bhutan and Daphla hills. The hills as we enter from the plains rise higher and higher with each successive range till the snows are reached; the valleys

Fig. 1.



KHASIA "THAPA" OR BASKET CHAIR.


ung
Ramdah
Daphla Hills
Valley of the Kameng R
Kheram R
Valley of the Tenga R

between each ridge being deep and narrow and the hills on either side most precipitous; and communications are restricted to a very few passes and fords. The outer ranges are uninhabited and it is not till the third is reached that the Aka villages appear; the first being that of Mehdi, the chief, whose supremacy is acknowledged by the rest, though, as is generally found among all our N. E. Frontier tribes, it is decidedly a case of *primus inter pares*. The next chief in importance, was a young fellow named Chandi who was educated in the Government School at Tezpur and received a small annuity from the Government, in the hope that he in turn would educate his tribe; but a little learning, as we know, is a dangerous thing, and the effect of a half education on Chandi was, as we often find nearer home, only to turn him into a malcontent, and he became one of the leaders of the raid within a very short time of leaving school.

The Akas* proper, or Hrussos, as they call themselves, are divided into two clans, the Kapaschors, i. e, "lurkers among the cotton plants" and the Hazari Khoas, or "eaters at a thousand hearths," both Assamese nicknames, the former indicating the predatory habits of the tribe. The latter has its origin thus. In former days each tribe had so many houses or villages in the plains assigned to them by the Assamese Râj, from which they levied blackmail. Even in 1884, the chief owned houses in the plains, the inhabitants of which were bound to feed him when he visited them. The former, i. e. the Kapaschors were the men we had the quarrel with and they number seven villages. These villages are very small, each consisting of a few houses only on partially cleared and open sites, with their fields adjoining. The fields are merely patches of cultivation on the natural slope of the hill and the crops are rice, millet, Indian corn and various kinds of vegetables. Their agricultural implements are confined to small axes and a broad kind of chopper called a "dâo": with which they fell jungle or dig the soil. The houses are long, barn-like structures raised on bamboo piles some four or five feet from the ground, which is not levelled at all, (see Fig. 2). The floor and walls are of bamboo matting and planks in bamboo framework, and the roof, grass or palm leaf thatching. In front is a small verandah in which the people sit and chat when day is done. The houses are very long, varying from 60 to 150 feet in length, and about 25 feet in width: unenclosed hearths of clay are constructed inside the house at intervals on each side of a central passage, and each hearth represents a family. For instance, the head of the house and his wife and unmarried children live at one end, and at each of the other hearths reside a son and his wife and children, if there are any; and, as families increase and more sons marry and bring more wives, the houses are lengthened. The planks are often 20 to 25 feet long and 2 to 4 broad, of soft wood, each hewn out of a single tree with much labour.

Granaries are scattered about in the fields.

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* The term Aka may possibly come from the Assamese word "Ak" or tattoo, as the Aka women use a kind of tar with which they mark their cheeks and chins on great occasions giving them the appearance of being tattooed.

There are no permanent defences of any sort round the villages. The Akas rely upon stockades and booby traps (described further on) constructed at advantageous spots outside and at some distance from their villages.

The Aka mode of burial is curious. The dead are placed in a sitting posture on a flat stone a little below the ground level. With the deceased are all his clothes, and over the body a dome of stones about four feet high, (see Fig. 3), cemented together with mud, is erected and presents the appearance of an oven. A brass lota containing rice, another one containing water, a string of beads, a knife &c., are to be found with the body. One tomb known as Taghi Raja's, (see Fig. 4), was more elaborate, square in plan and built up in three stories each smaller than the lower one, the whole about eight feet high. It was carefully built of stones and the edges fairly well squared.

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A good deal has been written lately about the rivalry between England and Russia in Persia. It undoubtedly exists, and it may naturally be concluded that if certain advantages such as the opening of the river Karun to trade are secured by England from the south, corresponding concessions will be demanded by Russia from the north. My present impression is that Russia will connect Askabad, Kuchan and Mashad by rail. Its extension will then follow *viâ* Jumain and Karman to Bandar Abbas the long sought for outlet on the Persian gulf.

Government.—The Persian Government has no debt as the revenue of the year always exceeds the expenditure. The Shah farms out each province to a governor. Ghilan it was said had been let for the year for £7,500. It is also said that if the Shah is in need of funds for a special purpose that he enquires after the health of his governors. A sum of money is remitted in response and if that sum is not considered sufficient the enquiry is repeated.

Army.—The army is now being trained and drilled by Russian officers, as infantry, cavalry and artillery. The material is said to be good and although a great improvement has been made there is a want of certainty or finality about the whole arrangement owing to the irregularity with which pay is issued.

Temporary Marriage.—Temporary marriage is an institution peculiar to Persia and four conditions are indispensable, *viz.*

The contract, which must be drawn up before a priest.

The personal conditions, wherein the woman shall profess one of the four supposed religions.

The dowry, of which the husband must pay half if he breaks off the match before marriage, and the whole if he repents his action after marriage.

The period, for which the marriage may be agreed upon.

The characteristics of the nation are, pride in its traditions; an invincible faith (as Shias) in the memory of Ali and the Imams, with a corresponding hatred of the Sunnis and their Caliphs, Omar and Abu Bakr.

The Main Route.—Kum is famous for its pottery. It holds also the shrine of Fatima, so sacred that its altar affords protection to all who seek it.

Near Passangun I met Dr. Woolbert who was "caravaning" to Teheran to join Maclean at Mashad.

Kashan is famous for its silk and velvet. At Ispahan I received a most hearty welcome from Dr. Hoernle. Here I called on the Zil-es-Sultan, the Governor of Ispahan, and the eldest son of the Shah. I was shown over the arsenal by Karim Khan Amir Panj.

Near Murghab is the tomb of Cyrus.

South of Sivand is Naksh-i-Rustum, the tombs of the kings, in a high sandstone hill and near Puzeh is Persepolis and Naksh-i-Rajjub.

Between Persepolis and Zirgan is the Kur river immortalised by Moore in the nymph's song to Azim who had lost his Zelica, as "Bendemeer's stream."

Shiraz with its cypresses, gardens, town and mosque is below hills in a highly cultivated and well watered plain. From Shiraz the journey has to be continued with mules as the country is so steep and paths are so rough.

At Pirizan where St. John was attacked by a lion commences the descent of 7,000 feet to the sea.

At Borasjan I heard much of the Persian war from a native point of view. How at Kushab the Persian square was astonished to see a few horsemen charge it, and that when our officers got inside the square the Persians did not attempt to kill them but looked on and wondered what was going to happen next.

My last march was to Shif across slippery mud and in a downpour of rain. However on reaching the sea, the *bandobast* proved to be good for there was Colonel Ross's launch with steam up, ready to take me to Bushire with my English letters to the latest possible date on board.

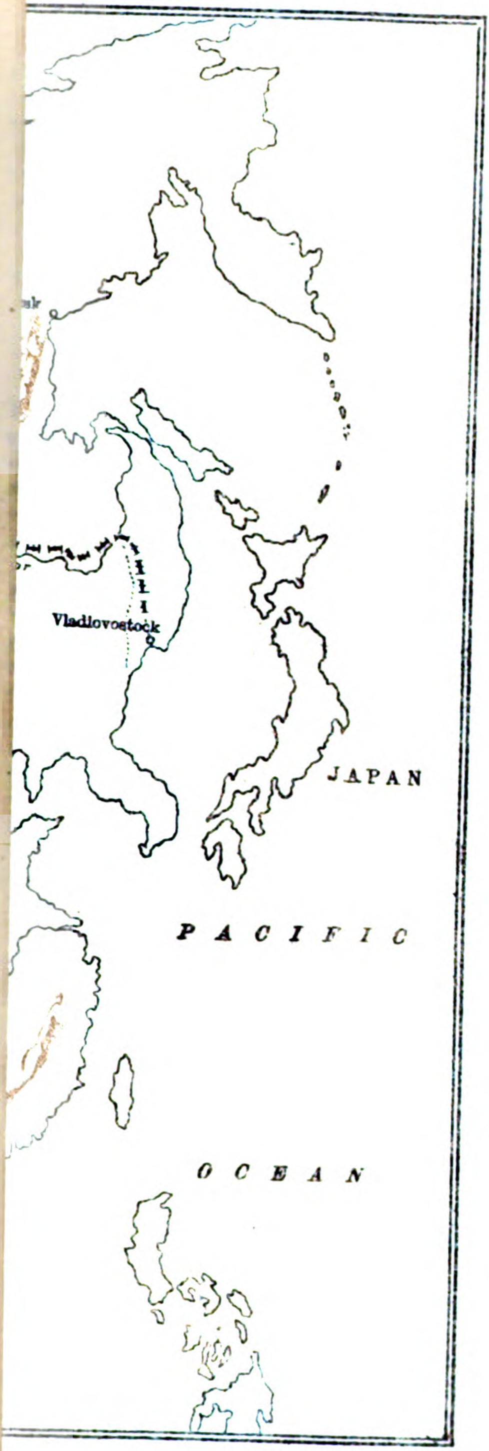
The British India Steamer "Pemba," Captain Robertson, carried me to Muscat, Karachi and Bombay where before the anchor was dropped my Portuguese butler came on board. Although I lapsed without difficulty into the luxuries of an Indian life, yet I was able in one month to record in print the bulk of my observations and place them at the disposal of the Government of India. I now take this opportunity of acknowledging that in compiling that report (by no means an easy task) I owed much to the encouragement that I received both by word and by letter from H. R. H. the Duke of Connaught, the Commander-in-Chief of Bombay.

Conclusion.—The moral of my tale is this, let those who have health, time and means venture occasionally from beaten tracks.

The world is not at rest and there are forces at work which but few see and fewer still understand. "Mites" called men are not one whit less busy than the more lowly organized creatures in their influence for good or for evil. The result of their labor is not less wonderful. "Earth worms" in Europe are supposed by Darwin to have been engaged since the creation in the agricultural function of regenerating the soil; while on the other hand, "white ants" according to Drummond's observations have been apparently commissioned, for some hidden purpose, to carry devastation into the forests of Central Africa. Can we in our finite knowledge pronounce upon man's work as advancing welfare or judge of it as leading to destruction?

The essence of my reconnaissance is that during 85 days, the average progress was 100 miles a day at an average rate of 10 miles an hour and the cost (including the first outfit) £ 215.

On the motion of the Chairman a cordial vote of thanks was given to Colonel LeMessurier for his lecture.


Vladiovostock
JAPAN
PACIFIC
OCEAN

Tuesday, August 13, 1889.

Brigadier-General C. E. NAIRNE, C. B., R. A.

Inspector-General of Artillery, in the Chair.

THE AKA EXPEDITION.

By Colonel R. G. Woodthorpe, C. B., R. E.

Deputy Quarter-Master General, Intelligence Branch.

In the autumn of 1883 I received orders from the Government of India to make all arrangements for conducting the exploration of the most extreme north-east corner of Assam with a view to discover the different routes leading thence into China and the present state of the paths and passes. A good deal of the country to be explored is entirely uninhabited and barren and so we required a large number of carriers; indeed I have found in all my explorations in Assam that to be independent of the inhabitants for carriage is the surest pass-port to success, and enables us to do more work and lose less time than when at the mercy of hill tribes who object to become coolies and never turn up when wanted. Just before leaving my head-quarters in Shillong, the hill station and seat of Government in Assam, Mr. Lyall the Secretary to the Chief Commissioner, Mr. Elliott, informed me that a small tribe inhabiting the hills north of the Brahmaputra in the Tezpur district who had given us very little trouble for many years had raided into our territory carrying off two natives, British subjects, from a place in the plains near the foot of their hills, called Balipara, where there is a Government rubber plantation and where the forest officer, Mr. J. Campbell, had his residence.

Mr. Lyall also mentioned the probability of an expedition being sent to recover the captives, and I therefore telegraphed to the Chief Commissioner to ask him if it would not be desirable for my party to go with this expedition if it was decided on, rather than proceed with my original programme, as that could always be carried out, whereas we had no knowledge whatever of the Aka hills and such an opportunity as the present might not again occur. I left Shillong on the 18th November for Gauhati where we were to proceed by river steamer up the Brahmaputra. My party consisted of myself, Messrs. Ogle and Ewing my civil assistants, two native surveyors, a writer, 60 *klassis* or instrument carriers, and 150 Khasia coolies, (men from the hills around Shillong), and I was to be joined further on by 100 more coolies from other parts of Assam. I had also with me six elephants which were permanently attached to my party.

Khasias certainly make the best porters for the hills on that frontier. They are strong, hardy, cheerful, easily contented, and can carry a load of 60 lbs. in addition to their own little belongings, generally, in all,

over 70 lbs. We had one man once with a great appetite, who was never satisfied with the ordinary coolie ration of 2 lbs. of rice daily, but wanted twice that amount: he was told that if he had two men's rations he must carry two men's loads, and this he willingly agreed to do, and did. They carry their load suspended by a band from the forehead, and this leaves their hands and arms free; a great thing when the road, as frequently happens, lies over or round steep faces of rock, with very little foothold, the chief support being obtained from canes and creepers, which the men clutch as they pass along. The Khasias have a peculiar kind of chair which they use for carrying people in, and which we adopted with great advantage for the transport of sick and wounded men. It consists of a stout bamboo, about five feet long, which is split up for about two-thirds of its length, (see Fig. 1). The split part is then opened out so as to form a funnel, into the bottom of which is worked a seat; half of the split portions are then cut away, and the rest are worked with cane into a comfortable back to the seat; a small foot-rest is suspended from the seat; and when one is accustomed to it, it is not at all an uncomfortable mode of conveyance. I was once carried thus by two men, turn and turn about, for six weeks in the Naga hills having sprained my ankle badly.

The rest of my party started to march from Shillong to Gauhati, a few days before I did, as I had work in Shillong and being able to arrange for ponies, intended to ride through in one day a distance of 65 miles. The ponies we have in Assam are of the Manipuri breed and though seldom over 12 hands are exceedingly strong and hardy and with a fair turn of speed for their size. On this occasion I had six ponies. I ought to have had seven, but one went astray at one stage and I had to walk 9 miles of the way, nevertheless I got through my 65 miles in 6¾ hours, two of my own ponies carrying me in the last 16 miles in the dark in one hour and 10 minutes. At Gauhati we embarked on board one of the fine steamers of the River steamer company and reached Tezpur on the 23rd November. There I found Mr. Elliott, who requested me to disembark my party till he received definite orders from the Government of India, as he fully expected sanction for the expedition: and Tezpur was to be the base of operations, (see Skeleton Map).

And here it may be as well, while awaiting these orders, briefly to give an account of the Aka hills, the Akas themselves, and the causes which led to the raid.

The Aka country, (see Sketch Map), is a small portion of the great Himalayan range of mountains forming the northern boundary of the province of Assam and lies immediately to the north of the British station of Tezpur, the seat of a Deputy Commissioner. The country consists, as we shall see, of a series of more or less parallel mountain ranges, steep and high, densely clothed with tall forest trees, with thick undergrowth of long grass, cane and scrub jungle. Among these ranges winds the Bhoreli river, rising among the lofty snowy peaks (23,000 feet above sea level) to the north, and receiving many important tributaries from the Bhutan and Daphla hills. The hills as we enter from the plains rise higher and higher with each successive range till the snows are reached; the valleys

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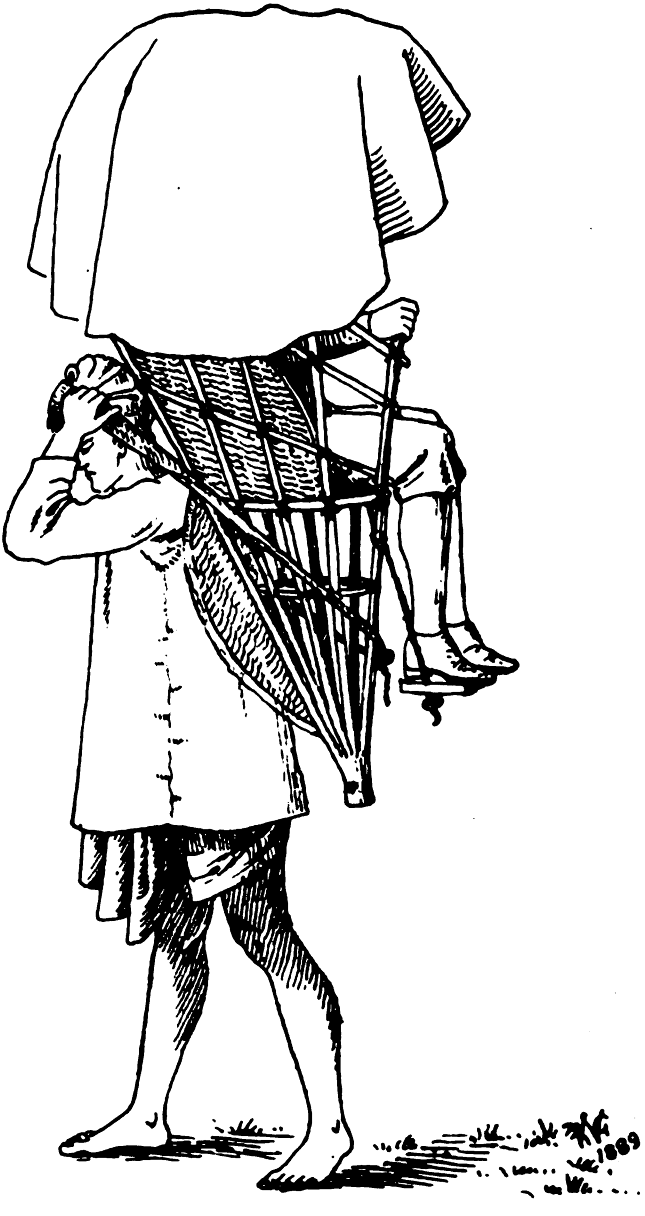

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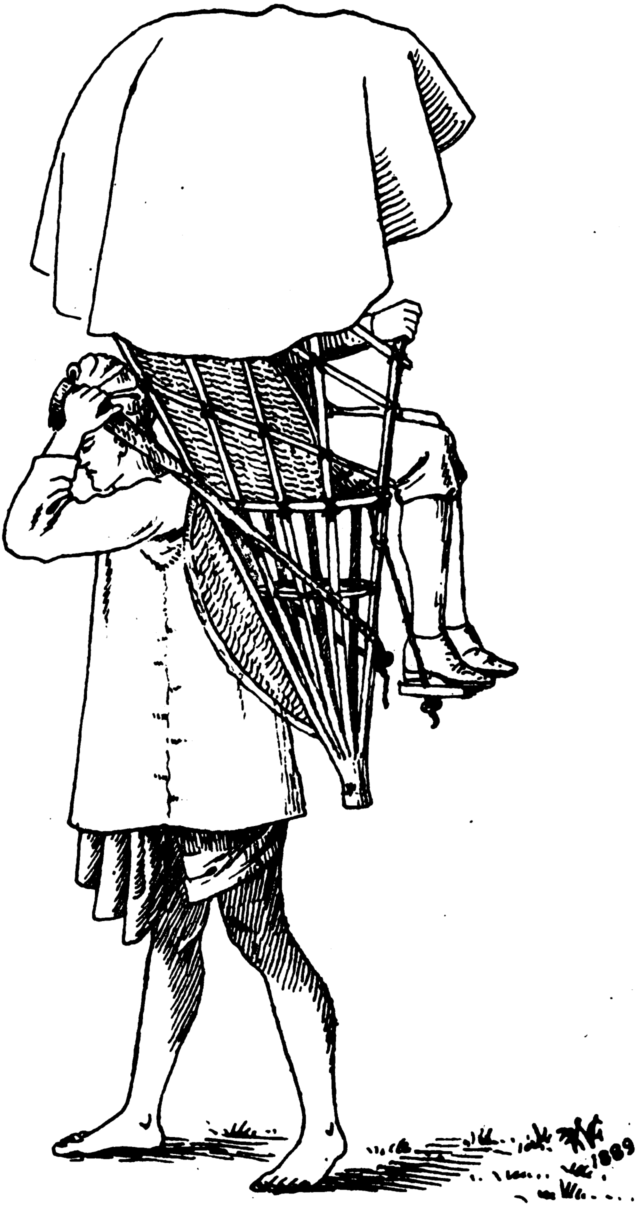

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between each ridge being deep and narrow and the hills on either side most precipitous; and communications are restricted to a very few passes and fords. The outer ranges are uninhabited and it is not till the third is reached that the Aka villages appear; the first being that of Mehdi, the chief, whose supremacy is acknowledged by the rest, though, as is generally found among all our N. E. Frontier tribes, it is decidedly a case of *primus inter pares*. The next chief in importance, was a young fellow named Chandi who was educated in the Government School at Tezpur and received a small annuity from the Government, in the hope that he in turn would educate his tribe; but a little learning, as we know, is a dangerous thing, and the effect of a half education on Chandi was, as we often find nearer home, only to turn him into a malcontent, and he became one of the leaders of the raid within a very short time of leaving school.

The Akas* proper, or Hrussos, as they call themselves, are divided into two clans, the Kapaschors, i. e, "lurkers among the cotton plants" and the Hazari Khoas, or "eaters at a thousand hearths," both Assamese nicknames, the former indicating the predatory habits of the tribe. The latter has its origin thus. In former days each tribe had so many houses or villages in the plains assigned to them by the Assamese Râj, from which they levied blackmail. Even in 1884, the chief owned houses in the plains, the inhabitants of which were bound to feed him when he visited them. The former, i. e. the Kapaschors were the men we had the quarrel with and they number seven villages. These villages are very small, each consisting of a few houses only on partially cleared and open sites, with their fields adjoining. The fields are merely patches of cultivation on the natural slope of the hill and the crops are rice, millet, Indian corn and various kinds of vegetables. Their agricultural implements are confined to small axes and a broad kind of chopper called a "dâo": with which they fell jungle or dig the soil. The houses are long, barn-like structures raised on bamboo piles some four or five feet from the ground, which is not levelled at all, (see Fig. 2). The floor and walls are of bamboo matting and planks in bamboo framework, and the roof, grass or palm leaf thatching. In front is a small verandah in which the people sit and chat when day is done. The houses are very long, varying from 60 to 150 feet in length, and about 25 feet in width: unenclosed hearths of clay are constructed inside the house at intervals on each side of a central passage, and each hearth represents a family. For instance, the head of the house and his wife and unmarried children live at one end, and at each of the other hearths reside a son and his wife and children, if there are any; and, as families increase and more sons marry and bring more wives, the houses are lengthened. The planks are often 20 to 25 feet long and 2 to 4 broad, of soft wood, each hewn out of a single tree with much labour.

Granaries are scattered about in the fields.

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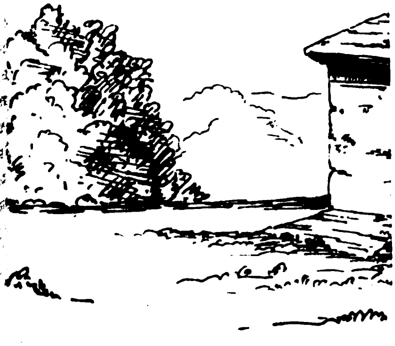

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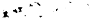

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strong and hardy and capable of great exertion. They are closely
to the Bhutias, possessing high cheek bones and obliquely set
their hair is long and done up in a tail twisted into a knot on the
the head. Their ears are pierced, and large cylindrical pieces of
or silver ornaments the size and shape of napkin rings distend the
greatly. As a rule they are very fair skinned. Their dress consists of
a kind of petticoat tied round the waist; over this is worn a jacket
of Thibetan or Bhutian manufacture, of coarse red material with
white or blue transverse bands ornamented with a small pattern.
of these jackets are sleeveless, and sometimes they are of white
obtained from Assam. Over these jackets are worn as shawls,
red Thibetan cloths, or Assam *eria* (*i. e.* coarse silk) cloths.
of many coloured beads adorn their necks and are worn as
keep up gaiters of loose pieces of cloth to protect their calves
bite of a very pestilent little fly called the "pepsi" or "
which abounds in these hills. Its bite raises a nasty little
coagulated blood, followed by swelling and intolerable itching.
victim's legs very often presenting the appearance of elephantiasis.
very thinnest cloth suffices as a protection against their attacks.
suffered greatly from these insects. The Aka head-dresses consist
broad cylindrical band of cane, wood, or leather, resembling a
without brim or crown. These are covered with cloth or pieces of
skins and further adorned with bunches of leaves, or the large
palm leaf, and when on the war path they attach small
bunches of leaves to their bodies in order to attract less attention
passing through the jungle. Some of the chiefs wear the curious
storied hat from Bhutan. They are inveterate smokers and pipes
never out of their mouths.

The weapons of the Akas are a bow, and arrows poisoned
a preparation of aconite, [illegible] from the
in the interior
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TAG

is so constructed that any attempt to draw out the arrow from a wound leaves the barb imbedded in the flesh. A small finger guard of cane is used and the left wrist protected by a bracelet of worsted against the bow string. Their other weapons are a long sword, 3 to 4 feet long, with a short wooden handle. They are left unsharpened for about a third of their length from the handle so that that part can be held and the sword used as a double handed one. This unsharpened part is sometimes bound with cord or cane as a further protection to the hand; these swords can be used, as such, or, by holding them short, can be used as knives or choppers. The sheath is formed by a cane bent into the shape of the letter ∩, a slit in the bent portion receives the blade the edges of which rest in grooves in the inner side of the arms of the ∩. In the baskets carried over the shoulder are *panjis i. e.* sharpened bamboo stakes used to stick in the ground to prevent pursuit.

The causes leading to the raid may be briefly stated as follows:—For several years past the Akas had been nursing a grievance against us for possessing ourselves of what they have ever looked on as their own property, viz., a large portion of forest land, in the plains adjoining their hills, which we included in our boundary when it was finally demarcated in 1873; and when a rubber plantation was formed on this land they saw a further cause of complaint. The Akas and their neighbours the Daphlas cut and bring down large quantities of rubber yearly for sale to the *kyahs* (*i.e.* native merchants and money lenders) in the plains: and, as rubber dealing seems to be even more demoralizing than horse-dealing, innumerable squabbles and much bad blood are the result; and the unfair dealings of these *kyahs* with the hillmen is another cause of discontent. In the Tezpur district lived a large land-owner called Lakhidar who was also a Government official and employed frequently by the Deputy Commissioner to act as mediator with the Akas who seem somehow to have imbibed the notion that he was mainly responsible for the rectified boundary, and it is not at all unlikely that he had been guilty of oppression at various times in his intercourse with the Akas. It was while matters were in this state that arrangements for the Calcutta Exhibition were set on foot. Mr. Elliott was anxious that each district should send down to the Exhibition several members of each hill tribe in, or on the frontier of, that district in charge of a political officer. Lakhidar was accordingly ordered to proceed to the Aka hills with a view to induce, if possible, a man and woman to accompany him to Calcutta. Lakhidar was not very willing to go apparently, but he did go, whether in deference to the orders he had received, or, as some think, from pressure put upon him by the *kyahs* with whom he was somewhat involved pecuniarily, and who wished him to arrange some rubber speculations with the Akas, I cannot say: but he went, and went to his doom; for he died a month later at the village to which he had been taken, when the Akas decided not to let him return. There is no evidence that he died by foul means, but he was treated harshly and lived roughly, and his effeminate nature could not stand it. He was kept confined in a cage about 12 feet long 6 wide and 6 high, made of planks planted upright, embedded firmly in the ground and roofed over with planks kept in position by very heavy stones placed above. This is the construction used for cages and traps for wild beasts. Further as a clog to Lakhidar's movements, and to prevent his running away on the few occasions on which he was allowed to take exercise, a big log of wood was fastened to one of his legs, after the manner adopted with slaves and prisoners of war. It is a large log with a hole in the middle wide enough to allow a man's foot to pass through; the foot is secured by passing a big nail though the log and the hole: a string tied to the ends of the log enables the wearer to take the weight off his foot when moving about. Lakhidar's mission caused great indignation among all the Aka chiefs who, from a misapprehension thought his object was to buy a chief and his wife to take away from their hills for ever, and finding their old enemy delivered into their hands they naturally kept him. Then they conceived the idea of having an exhibition of British subjects in their own hills; and a large body of them appeared one day early in November at Balipara, and after looting a few shops and helping themselves largely to country liquor, they proceeded to the bungalow of the forest officer, Mr. Campbell, who fortunately was away in Tezpur that night; and, not finding him, they went on to the forest ranger, a Bengali *babu*; and, seizing him and Mr. Campbell's native clerk carried them off in triumph to their hills.

There is a certain class of men in Assam called *kotokis*, or interpreters, in Government pay, men, who by their business as traders or by residence near or among the hill tribes, have acquired a certain knowledge of them and their country. In Tezpur were several such men knowing the Akas well, one old man having passed 20 years of his life as a slave among them, and these *kotokis* were at once sent up with demands for the release of the captives, but to all these demands insolent replies were returned refusing compliance except on the most outrageous terms including the cession of all the land claimed by the Akas and a very large sum of money besides. As nothing could be done by negotiations it was decided to send in a small military expedition. The whole of the 43rd A. L. I. from Shillong were ordered to Tezpur with the exception of a small detachment under Colonel Evans, which remained in Shillong: and a wing of the 12th Kelat-i-Ghilzais, under Colonel Madden, was ordered from Cachar. Half a mountain battery (two guns) under Captain Shirres, R. A., from Abbottabad; and half a company of Sappers from Roorkee under Captain Barton were also ordered to join the expedition.

Lieutenant Molesworth, with 100 men of the new Frontier Police, had already established himself at Balukpung,* commanding the Aka path so far as any stockade can do so in dense jungle. He had also selected the site for the advanced base at Diju Mukh.†

Pending the arrival of the troops and their advance into the hills I employed myself in clearing two points on a low range just within our boundary. These points were connected with two stations of the G. T.

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* Baluk = "a bear," pung = "salt lick."

† Mukh = "mouth," Diju Mukh = "mouth of the Diju."

Survey of India by myself and my two assistants; and from them the positions of a few peaks ahead were fixed by triangulation to assist us in plane-tabling when we advanced. A cold weather road was made by Mr. Elliott's orders between Balipara and Diju Mukh the junction of the Diju river with the large river, the Bhoreli. The usual way of reaching Diju Mukh from Balipara is by boat, but the journey occupies three or four days owing to the strength of the current and the numerous rapids; the despair of the traveller, but the delight of the angler, who finds many pools below the rapids whence the salmon of India, the *mahseer*, may be drawn. The fish in the Bhoreli run to 50 lbs. By the road the distance was reduced to 17 miles and was easily performed in a day. From Diju Mukh two paths run into the Aka hills, one due north following the Diju nearly to its source, then crossing the first range and descending again to the Bhoreli, at this point called "Maj Bhoreli."* Here the river is wide and deep and is crossed by the Akas by rafts and a cane suspension bridge. The road then crosses another range descending to the Tenga river (a small hill stream coming from Bhutan); and ascends finally to the villages of Labi, Mehdi, &c. An alternative route lies entirely on the right bank of the Bhoreli, the crossing of which is thus avoided. Although warned that we should have great difficulty in crossing the Maj Bhoreli, that route was adopted as the *kotokis* reported that the other path was an exceedingly bad one, passing over rocks and boulders which would offer insuperable difficulties to laden coolies. As it was afterwards seen the difficulties were not so great; a detachment returning that way. It is however a question if the gun coolies could have got over some of the obstacles and a road would have had to be made for them. The *kotokis* had misjudged the powers of our hill coolies, their experience being confined to the Assamese, miserable carriers, even in the plains. Our Khasia and Mikir coolies carried their loads on their backs supported by a strap passing over their foreheads, thus leaving their hands perfectly free and enabling them to climb up and down places impassable to coolies carrying their loads as the Assamese do, in a couple of bundles suspended at the end of a bamboo resting on one shoulder. The transport coolie (Punjabi) carries his load on his head, a clumsy and top-heavy method on a steep hill side, or when clambering over rocks.

One day Mr. Elliott paid me a visit on my hill and told me it was considered that the only way of saving the *babus* was by a rapid march on the Aka villages and that Major Beresford with 150 men would push on at once; and, as the transport and commissariat had not then been organized, and only a few Punjabi coolies had arrived at Tezpur it was proposed to utilise my coolies, whose number under the altered circumstances far exceeded my needs. I promised him 150 with their food for ten days.

Six weeks had now elapsed since the *babus* had been carried off and the delay of a few days as it turned out, would have been unimportant

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*** Maj = middle (Assamese). The *kotokis* having an idea that this was about the middle portion of the river between its source and mouth.**

when weighed against the advantages of having everything in complete working order to start with. Had it been possible to send a small party up immediately on the heels of the raiders, no doubt the moral effect would have been great and the prompt release of the captives ensured, but that had not been possible and the time had now gone by for any attempt at a surprise. No one, I think, fully realized, nor indeed anticipated the difficulty we should experience in getting even 150 sepoys with their coolies across the Maj Bhoreli; and these hills on the north bank of the Brahmaputra, the Miri, Aka, Daphla, &c., especially the Aka, are so different from, and so much more difficult than, those on the south bank, the Khasia, Naga hills, &c.

During the first part of December all the 43rd arrived and were pushed on to Diju Mukh by boats, carts and elephants and on the 17th Major Beresford's party started. It consisted of three native officers and 151 rank and file of the 43rd; and one native officer and 50 Frontier Police under the orders of Mr. Savi, an energetic police officer of great experience in these hills. With Major Beresford were also the following officers:—

Lieutenant Cowley, 43rd A. L. I.
Major Macgregor, D. A. Q. M. General.
Captain Maxwell, Political Officer.
Captain Turnbull, Transport Officer.
Mr. Latouche, Geological Survey.
Mr. Ogle, and myself.

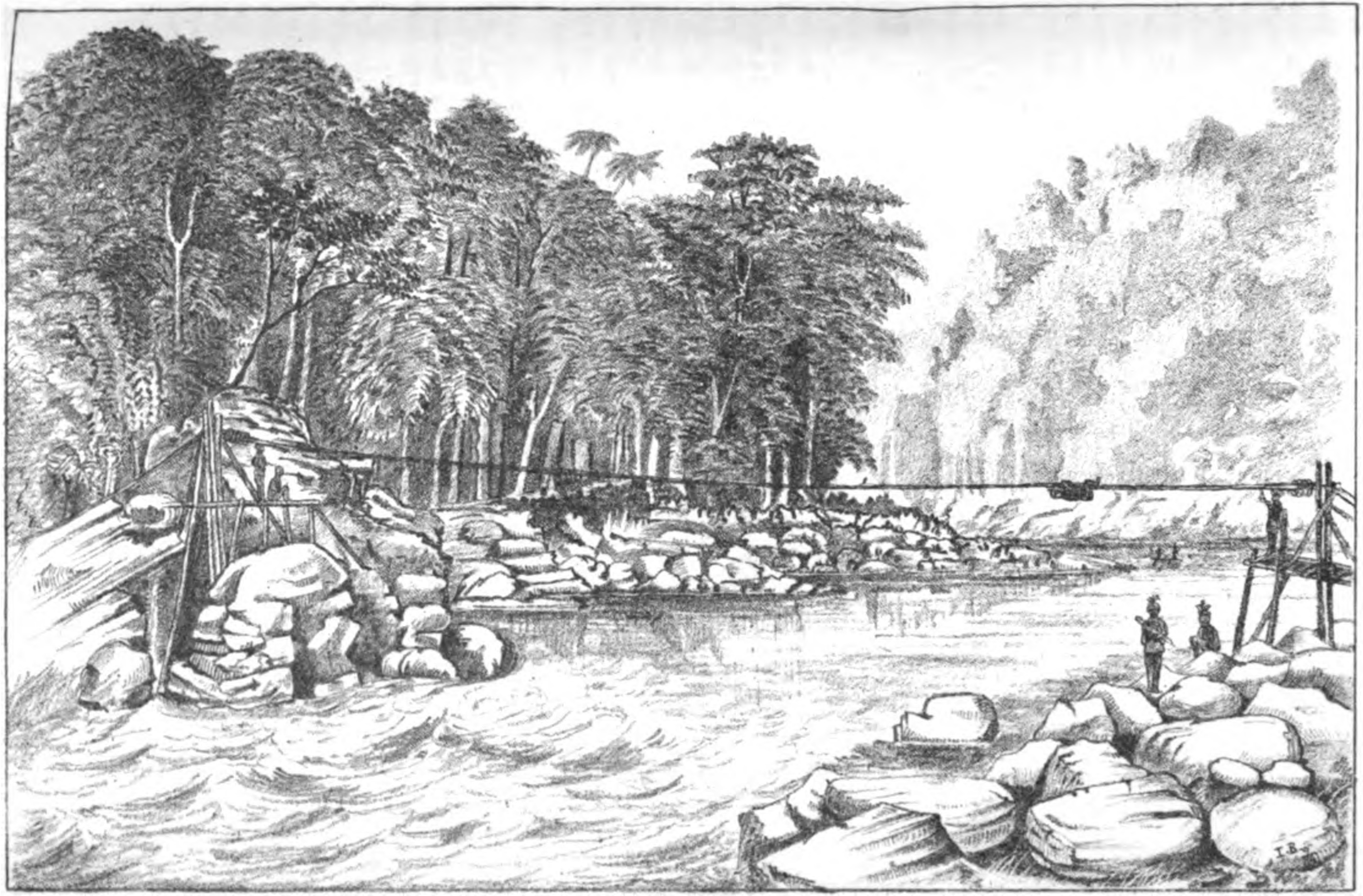
Major Beresford's instructions were to move as rapidly as possible on Mehdi's village which it had been calculated he could reach in about seven days. The troops had a fortnight's supplies with them but for want of carriage the coolies had only ten days, and it did not apparently strike the transport officer that they could possibly require more. Major Beresford was strictly enjoined never to proceed beyond communication and at each camp he was to establish 50 men in a stockade to keep open our communications. Many of the Punjabi coolies on arrival at Diju Mukh had been found unfit for work and we were rather short of carriage and our scale of baggage was exceedingly limited in consequence, as at first only one coolie was told off to each officer; but, as in the absence of any commissariat arrangements, we had to carry our own food and stores, two coolies were eventually allowed. Generally I carry a large waterproof sheet 12 feet by 8 feet which makes a fair sized covering to my small and light camp bed which is a necessity in that country, where camping out for any length of time, and sleeping frequently on the ground is certain to bring on fever. The Khasia and Mikir coolies and the Gurkha sepoys are wonderfully good hands at running up little leaf and grass huts, for which there is generally plenty of material, and in an hour comfortable little "bashas" as they are called are provided for the officers, and long sheds for the troops. More time is required to make them waterproof but this is best accomplished by tying down water proof sheets outside; not inside, as the water leaking through the roof, turns the sheet into a hanging reservoir of water over the sleeper's head and an unwary movement on his part will suddenly empty it in some unforeseen direction, generally on to his only dry clothes. My kit consisted of a couple of *khaki* drill knickerbocker suits, two sleeping suits and a warm coat for evening; and I have always found it a good plan to adopt what I see Major Fraser suggests and Colonel LeMessurier carries out, *viz.* when dressing for dinner, to dress for bed. There is nothing so restful as a bath and a thorough change of clothes after a hard day's work; and by going to bed with one's socks on (which the temperature at night generally renders a comfortable proceeding) one can turn out at a moment's notice in case of a night alarm. The rest of my garments (which all packed up in my bedding) were rolled up to form a pillow.

The morning of the 17th December, when we started from Diju Mukh, was very wet and we commenced our march in a heavy downpour, which fortunately ceased towards afternoon. Our way lay up the Diju river, a small stream about two feet deep, flowing noisily over its open stony bed between banks clothed with densest forest and creepers. This river we had to cross and recross at least 20 times during the day's march and our progress was not very rapid. Many of the coolies had not arrived at Diju Mukh till that morning and so we had been unable to start till 10, and we did not make the point we had hoped to reach that night: but, finding a fairly good camping ground on a little island, and some open spaces on the adjoining banks just within the gorge of the hills we halted there. On the way, from what cause it is impossible to say, cholera broke out among the Khasia coolies. The first case was sent back to be treated at Diju Mukh, but on arriving in camp two other Khasias and one of my *klassis* were attacked and died during the night, which was wet again, unfortunately. The next morning we moved on over large and slippery rocks and boulders through the narrow gorge, till we reached the point where the path crosses the first range of hills. Here Major Beresford decided to halt while the road ahead was explored by Major Macgregor, who with a naik and six sepoys proposed to go on to, and bivouac on our side of the Maj Bhoreli, to see what the path was like and to send back a report to meet us early next day. The *kotokis* told us that the path was exceedingly long and steep on either side of the range and that there was no water between the Diju and Bhoreli. The *kotokis* might, as usual, be exaggerating the difficulties, but at the same time it would have been unwise to have taken all the camp on while uncertain as to the state of the road. We hoped moreover that a short march might give the coolies a rest and enable us to look after the cholera patients, of whom we had several fresh cases. Captain Maxwell and I accompanied Major Macgregor as far as the top of the hill and found the path a little better than we expected, though trying in many places for laden coolies, where it was very steep and slippery and only two feet wide with a precipice on either side. The knife edge character of these ridges and spurs is a distinguishing feature in these hills. I remember once the path being so narrow, and the hill on either side so precipitous, that a forked tree growing on the ridge could not be turned and the path went through the fork. Any false step in such places meant death to the coolie. Mr. Ogle, my energetic senior assistant, remained in camp to look after our coolies. He has been associated with me for many years in almost all my exploration in Assam and followed me to Afghanistan. He is an excellent surveyor, strong, plucky, cool, with great powers of endurance and possessed of a good deal of foresight and forethought, and I have ever been indebted to him for much of the success which has attended our joint work. On this occasion he did not spare himself at all on the coolies' behalf; he went round cheering them, giving the sick medicine, and those who were still well, tots of grog from our scanty store to put heart into them, and yet they died, and then he saw them properly buried. They sleep in a beautiful spot, where the graceful bamboo waves over them and the murmuring stream for ever lulls them to rest, but also for ever cuts off their souls from intercourse with their departed ancestors who lie buried in the Khasia hills. The spirit of the age, scepticism in, and abandonment of, the faith of our forefathers, is invading even the Khasia hills and possibly may have attacked this belief. But they did formerly firmly believe that any running water between a man's burial place and his own country would effectually prevent his soul from returning home, unless his relatives could reach that water and get a thread unbroken across it by which the impatient soul might pass over. We seldom escaped cholera in returning from camp in Assam, but we seldom got it going into camp. On this occasion we lost many coolies in those first few days and an anxious time it was. It is so bad to see men dying in a few hours in spite of all one can do for them. A strong coolie would trudge gaily into camp, deposit his load and go whistling off to prepare his food. A few minutes later he would send to me to say he was ill, and in six or seven hours he would be dead. As, at starting, we had had no sickness we had gone off without a European doctor. There was Dr. Johnson with the 43rd, but he had to remain at Diju Mukh to arrange the base hospital and inspect the various batches of transport coolies as they arrived. We had two native doctors or rather hospital assistants with us it is true, but without European supervision the ordinary native doctor, with very few exceptions, is practically useless.

Our camp in this place, afterwards officially known as No. 1, was a nasty confined one, but on the right bank was a small steep knoll on a projecting spur, which afforded an excellent site for a stockade. This was cleared during the day, and a strong stockade erected by the guard remaining behind. This was to be the first stage for the future from Diju Mukh.

On the 19th December we crossed the range at an elevation of 3,000 feet, our camp of the previous night being about 1,200, and descended to the Maj Bhoreli, 600 feet, and encamped on its left bank on a long and narrow strip of stones, boulders, and shingle; the coolies being camped in a fine open stretch and the sick below them again. The hills shut us in to the south, and early in the afternoon the sun left us and the camp became very cold and damp, the only advantage being that the *pepsis* which swarm there become less energetic in the cold shade and go to bed under the stones till the sun calls them up again to renewed vigour. As is the case in all parts of Assam we were well off for

Fig. 5.



AKA SUSPENSION BRIDGE OVER THE MAJ BHORELI assistant, remained in camp to look after our coolies. He [illegible] associated with me for many years in almost all my expe[illegible] and followed me to Afghanistan. He is an excellent surveyor, [illegible] cool, with great powers of endurance and possessed of a [illegible] foresight and forethought, and I have ever been [illegible] much of the success which has attended our joint work [illegible] occasion he did not spare himself at all on the [illegible] round cheering them, giving the sick medicine, and those [illegible] well, tots of grog from our scanty store to put heart int[illegible] they died, and then he saw them properly buried. They [illegible] ful spot, where the graceful bamboo waves over them and [illegible] stream for ever lulls them to rest, but also for ever [illegible] from intercourse with their departed ancestors [illegible] the Khasia hills. The spirit of the age, [illegible] donment of, the faith of our forefathers, is invading [illegible] hills and possibly may have attacked this belief. [illegible] firmly believe that any running water between a man [illegible] own country would effectually prevent his soul from [illegible] unless his relatives could reach that water and get a [illegible] across it by which the impatient soul might pass over. W[illegible] escaped cholera in returning from camp in Assam, but [illegible] going into camp. On this occasion we lost many [illegible] days and an anxious time it was. It is sad to see [illegible] few hours in spite of all one can do for them. A [illegible] trudge gaily into camp, deposit his load and go [illegible] his food. A few minutes later he would send to me to say [illegible] and in six or seven hours he would be dead. As at start[illegible] no sickness we had gone off without a European doctor [illegible] Johnson with the Lord, but he had to remain at [illegible] the base hospital and inspect the various batches of [illegible] they arrived. We had two native doctors or rather [illegible] with us it is true, but without European [illegible] doctor, with very few exceptions, is practically useless.

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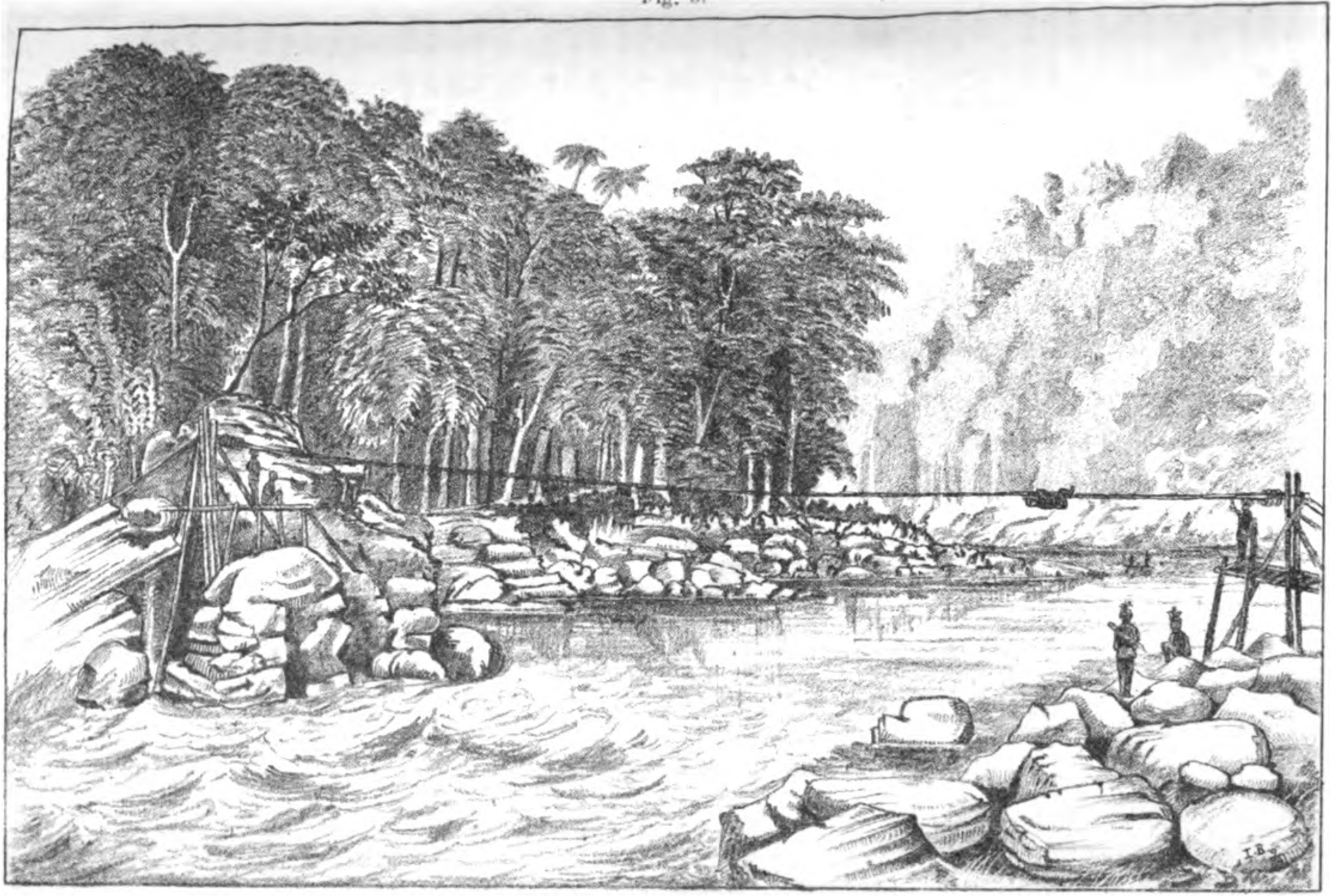
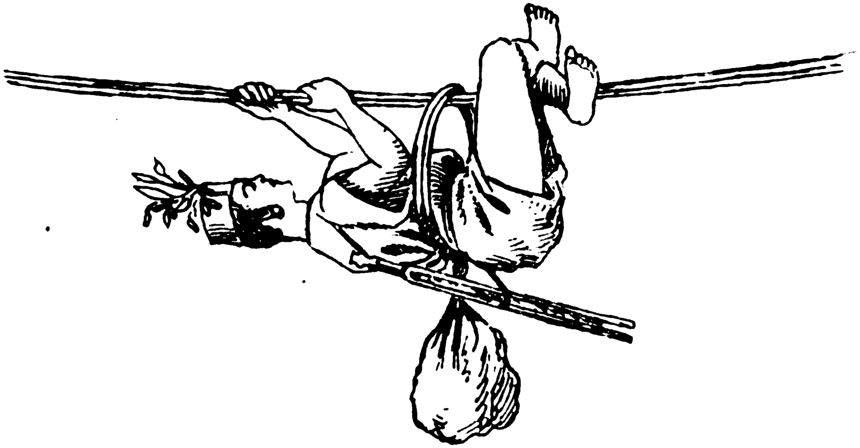
Fig. 5.



AKA SUSPENSION BRIDGE OVER THE MAJ BHORELI

Fig. 5.



AKA CROSSING THE BRIDGE.

firewood. On the path down we came across some good coal which is to be found in great quantities in these hills. Below our camp at a point where the stream narrowed to about 50 yards in width and where a magnificent rapid boiled and raged over the rocks, which vainly attempted to stem its course, was the Aka suspension bridge. In my Mishmi report in 1877-78, I described their bridge which is the same as the Akas' and my first experience in crossing it. I quote from it now—

* * * * *

"It has been well described by Wilcox as follows:—A stage is erected at a considerable height above the water (at Chini it was about 60 feet) on either bank, and well secured with large stones and canes made fast to neighbouring trees. The three (or four) canes composing the suspension rope, (see Fig. 5), pass over well secured supports on the stages at either end, and are separately fastened to trees, so that should one of them prove not trustworthy, others still remain. Before the stages a number of hoops hang (on the suspension rope) ready for use. They are made of a short length of cane coiled like a roll of wire. The passenger inserts his head and shoulders through one of these, and brings it under the small of his back. He then passes several loops of cane hanging from the ring under his shoulders and back of his head to support that part; two other strips tied at the lowest part of the ring are then passed upwards between his legs and tied to the upper part of the ring, this is to prevent him from slipping out of the ring if his feet slide off the rope. These rings and strips are not always used, in the Aka bridge they were absent. Then, throwing his heels over the cane, and using both hands and feet, he starts off. One of my two guides went across to shew me the way, and when he returned, and I intimated my intention of crossing, their delight knew no bounds; but they explained that I must make up my mind to go right across, as no turning short of that is possible, the passenger being only able to travel head first. The nervous part about this method of travelling is the knowledge that no help from others is possible, if anything should happen in the middle of the bridge. However, this is a far pleasanter mode of crossing rivers than would at first sight be imagined, and preferable to the tubular bridges of the Miris."

At Maj Bhoreli we found Major Macgregor who told us he had seen an Aka man and boy on the bank the previous afternoon, on his arrival. The man shouted something the *kotokis* did not understand and danced about, and then he and the boy disappeared. Major Macgregor took such precautions as he could from his side of the river to guard the bridge which he feared might be cut during the night, but fortunately for us it was not. On the other side of the river was a raft, and as on our side very little material for making rafts existed, while on the north bank grew bamboos and canes in profusion it was necessary to secure that raft. One of the *kotokis* was crossing by the cane bridge for this purpose when I got down to the river. He called out that he could not manage the raft himself, so, as I was the only other man in our little force who had had previous experience of this kind of bridge, I followed him, requesting Major Macgregor to keep a good look out to see that no Akas came down on us on the opposite side. Lurking devils! the jungle might swarm with them and there would be no sign of their presence. We went over and brought back the raft unopposed; and then all our coolies arrived and camp was formed. The next day early a working party was crossed to collect material, and all hands were employed in making rafts, and trying to bridge the stream. I had hoped to have been able to utilize the Aka bridge, but though we searched far and wide we could find no canes long enough or strong enough: those composing the bridge were a couple of light strong canes selected with great care, and, as we afterwards found, only procurable at the top of the range ahead. This bridge was strong and admirably adapted for Aka purposes, but we could not have trusted to it to cross our men by; we constructed a cradle capable of carrying bundles up to 80 lbs. in weight and by this means hauled across most of the stores and baggage.

We had started without any sapper equipment, and Captain Barton with his sappers was still several days journey behind us; and we had no skilled labour. We had one piece of rope obtained in Balipara and I tried a flying bridge with it and a raft; but the rope broke at a critical moment, and the raft nearly went over the rapid: such canes as we could get were also tried and failed to stand the necesssary strain, and the river was too deep for trestles.

It was evident therefore that in order to get our men across we must put our hope in rafts only and all hands worked hard at them. On the 22nd we got most of the fighting men and some coolies across and on the 23rd the remainder crossed. I must mention that a young Doctor, Grant, had fortunately arrived a few days before, and by the 23rd our bill of health was a much cleaner one. He is a clever doctor and was very active and untiring in his exertions for the sick and the result was soon visible, though we had begun to fear that we should never get rid of the cholera, so persistently had it remained with us even in the open camp we had on the banks of this fine river. We had received another addition to our number in the shape of a sporting tea planter who came up in the character of war correspondent for the "*Englishman*" newspaper, but had not expected to meet cholera and to have to rough it as he had to. He was well known as requiring three bottles of beer at breakfast, to say nothing of other meals. Why he wished to go with us was a mystery to us all. He was not an active man and could not walk up hill a little bit: he was not a good writer and had no imagination on which to draw for his facts. He was a failure. Our new camp on the north bank was on a wide delta of stones and boulders brought down by a stream, small enough now but evidently formidable when swollen in the rains. This delta was very wide at its mouth and stretched up into the hills narrowing gradually as it rose. It was fortunate for us that our ground was like this as it enabled us to place our picquets in advance of the camp.

While our rafts were being made Captain Maxwell had sent forward some of the *kotokis* to find out what the Akas were doing and if they had any intention of giving up the prisoners. They found the Akas encamped in several places along our onward path above us about three miles off, and Mehdi sent back a message to say that he was bringing in the captives and we might expect him on the 23rd. Political considerations on our Indian frontier frequently clash somewhat with military precautions, and altho' Major Macgregor wished to reconnoitre the road ahead it was feared that an armed party going on and meeting the Akas might provoke hostilities, or at least frighten the Akas away and prevent the surrender of the captives. The *kotokis* were again sent up on the 23rd and returned to say that they had seen a few Akas who told them Mehdi was escorting in the prisoners and would be with us next day. Maxwell did not fully believe all this, yet his orders were strict and had it happened that the Akas had been frightened away by a reconnoitring party he would have been blamed, and morever it was possible that the Akas were sincere. The sequel shows that they were not. That night, a dark starless foggy night, the mist dripping from the trees with saddening sound, the camp was aroused at 12 o'clock by shots from our outpost and every one turned out immediately to find that a large body of Akas, who must have been for some time assembling under cover of the jungle, had attempted to rush the camp, as soon as they thought we should be all asleep; but coming across our picquets had been checked, and after a brief and somewhat severe struggle had been repulsed, with the loss on our side of one havildar killed, his skull cloven in twain, one sepoy wounded in the neck by a poisoned arrow and four others severely wounded by cuts. The enemy had not left any dead or wounded on the field, and after lurking around for some time amusing themselves by firing an occasional arrow at us they apparently retired. In the meantime the wounded had been brought into a place of safety, and it was a matter of difficulty to find them lying out among the stones in the dark, as we could not shew a light while the Akas were so close. We then went round the outskirts of the camp to see that all was right, and the picquets were frequently visited, but the Akas did not come again and there were no false alarms; which I think speaks well for the fire control under Major Beresford when we remember the circumstances and surroundings, the recent noiseless and sudden attack with its fatal results to at least two of our men, the dark foggy night, the damp drip from the trees, and all the other countless sounds of the dense jungle which fall upon an anxious listening ear. There was not one shot after the bugle sounded the final order to cease fire at 1 o'clock, and, recollect, that there were still five hours of darkness.

When day dawned and the jungle and bed of the stream were searched we found tracks on which pools of blood shewed that our enemy had not got off scot-free and a large number of bows and quivers full of arrows, knives, head-dresses, &c, being picked up proved that the Akas had decamped somewhat hurriedly.

Major Beresford had intended to advance on the 24th, but the men who were to have joined us to hold this camp had not arrived, and as the Akas had proved so decidedly hostile, it was necessary to leave a strongly stockaded party here. The stockade was constructed on the 24th and 25th. On the 24th Major Macgregor, Captain Maxwell and I, with a small force cautiously reconnoitred the path on ahead by which the Akas had come down the night before and found a stockade and strong obstacles constructed a little way up the hill, after the path leaves the ravine. Above the stockade we found several Aka camps deserted. We had shortly before leaving camp heard the shouts in unison of a large body of them above us on the hill, resembling the war cry of the Nagas, and we thought we were in for a little fun, if booby traps and poisoned arrows can be called fun. The foe, however, was only retiring and our subsequent experience taught us that the Akas always shout loudest and most defiantly when they have finally decided to go and see how their mothers are getting on. And so we saw nothing of them that day. On the 25th further reconnaissances were made to the top of the hill and the road improved. In camp the stockade was completed and we eat our Christmas dinner inside it.

On the 26th we started again to the top of the hill; the ascent (4,300 feet) is one continuous slope, seldom less than 20° and often as much as 35°. At the top we found a small natural clearance at the edge of a big precipice from which we got a magnificent view of the country we had passed through, the plains of Tezpur and the Brahmaputra. The ascent was trying to the coolies who came up slowly, so Macgregor, Ogle, Latouche and I went on with the scouts to see how the land lay ahead. The descent was a long one and we had frequently to pause to pull up newly planted *panjis*, artfully placed below a little drop in the path and in places where likely to attract least attention. About half way down through a little opening among the trees we caught a glimpse of Mehdi's village across the Tenga river looking very close to us and above it towered a magnificent snow clad peak, rosy in the afternoon sunlight. Continuing upwards we heard sounds of cutting evidently made by men going before us, snicking the bushes as they went, probably the *panji* planters. At 4 o'clock we reached a point where a spring of water rose by the path which passed over a knoll hard by, affording a good camping ground evidently in use by the Akas, some of whom we heard approaching. We awaited their coming, but an excited sepoy unfortunately fired before they came in sight and they fled, leaving some of their property behind.

We then commenced to clear this spot and, the coolies coming in soon after, we formed camp without delay; and a very crowded camp it was. Here all separate dwellings had to be abandoned and as many as could doubled up in each *basha*. The mess was broken up and dinner was served to each one of us sitting on his bed on the ground, there being no sitting room elsewhere. Next day we advanced again to go down to the Tenga river and crossing it to reach Mehdi's village if possible. The path down to the river is very narrow down a sharp precipitous spur, the last 100 feet being by steps cut in the steep bank with canes and creepers as hand ropes. Thorny cane bushes (any attempt to push through which, turned you, as Dr Grant said, into a living pincushion at once) and tangled creepers choked the space between the tall trees on either side of the path and quite prevented any attempt at scouting along our flanks. Some flankers indeed were sent out, but these obstacles and the steep fall of the hill side, prevented their keeping ahead of the advance guard, or even up with it, and they gradually fell in behind the rear guard. Our order of march was here as follows:—three scouts, Macgregor, his orderly, myself, orderly and sepoys, Ogle, Latouche, then Beresford with the main body, and the coolies.

It was impossible here to move except in single file and along the path and as we turned a corner where the path suddenly ran below, instead of along, the ridge we heard a sharp report and our leading scout fell with half his head blown off by the slugs which rattled among us from the gun of an Aka concealed just ahead with a companion, but did no further damage. The Akas slithered down into the jungle at once before we could get a shot at them, their little game always. There is nothing more demoralizing than the thought that each bush may harbour a poisoned arrow aimed at you. I have felt more comfortable facing rifle bullets and shot and shell, than these arrows, and they have this aggravation that they come upon you so noiselessly, you are shot without any sound, or smoke, or sign whatever to give you the slightest clue to your enemy's whereabouts, so that you have not even the poor satisfaction of a return shot. To proceed. We went on to the river, and the appearance of our leading man at the water's edge was the signal for a flight of arrows from the opposite bank. Our men were kept well under cover and only one casualty occurred, but that a sufficiently demoralizing one. A young Gurkha was shot in the thigh just above the knee; a small punctured wound looking no more serious than one often gets pushing through a hedge out shooting, but he was dead within 1¾ hour. It was evident that the enemy were strong in numbers and strongly posted to oppose our passage at this point and so we tried to find another crossing.

Here there was a small trestle bridge, the foot-way only one bamboo wide, across which the troops could only go singly and slowly, and it was thoroughly commanded from the other side. I therefore made a reconnaissance of about a mile down the river to find a safer crossing, and a camping ground which would be secure from attack. The result of my observation was that there was no crossing less commanded, and no camping ground. A small flat space there was, but covered with thick thorny bushes and long grass which would take time to cut and clear away, and the camp when formed there would have been commanded from all sides and would have been quite untenable at night, so camping there was out of the question and there was no water onwards till the villages were reached. On reporting all this to Major Beresford, he held a consultation with Major Macgregor, Captain Maxwell and myself as to what was best to be done; and, little as any of us liked the idea of having to return to our camp of the previous night we decided to do so for the following reasons. In the first place we were ignorant of the path and country ahead and could not place full reliance on the *kotokis'* reports and we were also ignorant of the enemy's strength and position, which was entirely hidden by the dense jungle which prevented our seeing anything. All we knew was that the Akas were in great force on the opposite bank and that for any one of us to expose himself in the slightest was the signal for a shower of arrows. The fighting men might have made a rush across, but, once in the jungle on the other side, they would not have known in which direction to work, and although, if we had had no coolies to think of, an attack might and probably would have succeeded but with great loss no doubt, there were other considerations. We had a long line of coolies perforce weakly guarded, who could not possibly advance with a rush; the Akas, slipping by our advance, could easily have spread a panic among them and like frightened sheep they would have thrown down their loads and rushed into the jungle, to be cut up in detail. Also we did not know how far we should have to advance before halting with any safety; but the most important consideration of all was that our detention at Maj Bhoreli had run away with our provisions. Delays had occurred in the arrival of the commissariat supplies and the transport officer seemed unable (notwithstanding my repeated representations) to realize that the ten days' provisions I had originally given the coolies would not like the widow's cruse, go on for ever, and he had made no arrangements for getting up more, and we had food for our coolies for that day only. To go on further into that unknown and hostile country was to run the risk of starvation, as it was not unlikely that we should be cut off from our communications for a time, as our little force would only have been sufficient to guard our camp, if surrounded by the enemy, and could not have furnished reconnoitring parties, nor escorts for our coolies to return over such a long unprotected line as would have lain between Mehdi's village and No. 2 camp. So, reluctantly we retraced our steps for the ¾ mile to our last camp. A delay of a few days would enable us to get up enough food to take us on and also a guard to leave behind at this camp which henceforth was known as No. 3. I have heard that this retrograde movement was advertised by newspaper boys in London as "Another British defeat: Major Beresford's party repulsed." On reaching camp we at once set to work to clear the trees away and run up a hasty palisade. This partial clearing shewed us where we were and enabled me the next day to point out to Major Beresford exactly the directions in which clearances should be made to command good views of the enemy's position. A certain number of coolies and all sepoys off duty were told off to this work and to improve the defences. The rest of the coolies were sent back for provisions and with them went our correspondent. He said cholera had been bad enough, but when followed by actual fighting and little to eat he could stand it no longer. Macgregor, Ogle and I went up to the natural clearance above mentioned and by cutting down a few trees not only made a good plane-table station whence we could get a good idea of the drainage and general run of the hills, but also established signalling communication with General Hill at Diju Mukh. Henceforth it became a regular station and signallers went up daily. As soon as the General received Beresford's report of the occurrence at Tenga he ordered him to stand fast at No. 3 till he himself should arrive with the guns, and direct further operations. I do not consider that in warfare of this sort mountain guns do much actual damage, but their moral effect is no doubt very great, and the General hoping to prevent unnecessary loss by their employment, did not wish us to provoke further hostilities at the Tenga.

In the meantime Macgregor and I made reconnaissances in every direction, painfully cutting our way. Ogle made himself very useful as a signaller, also in building the stockade and directing the felling of trees: and one day we measured a base and from it, with a theodolite, determined the distances of all the principal points in the enemy's position. These the gunners found useful when they came up. All this time we were not left in peace, Akas shouting near us in the evening and threatening our line of march when the coolies travelled to and fro bringing up supplies. On the 1st January a large body of coolies was going back to the Maj Bhoreli camp, and Ogle and I accompanied them as far as the top of the hill to do some work. About half way up, a sepoy in front of me suddenly turned round with an arrow in his neck and at the same moment a fearful howl of fright and anguish from my coolies behind made me fear some of them also had been hit, though I found on enquiry that the arrows fired at them had done no harm. We searched the jungle and found the Akas' hiding place but as usual they had slipped down hill after firing their volley. All the coolies were then sent on with an escort under Mr. Ogle's supervision and had one more brush with Akas higher up, but without any casualties. Major Macgregor and I remained with the sick man who was almost senseless and vomiting terribly, sending down to the camp for medical aid. While waiting we heard a shout at intervals just below us, answered from the ravine lower down by war-cries which gradually grew nearer; and we fully expected an attack. The old *kotoki* with us said "Fire! Fire! and try and frighten them", but we preferred to wait and see our enemy first. We had placed our sick man in the middle of a small clearing, and our little force consisted, besides Macgregor and myself, of his orderly and my Gurkha *khassi.* I gave the latter one of my rifles, and we each took up a position commanding the various approaches, occasionally doing a little scouting. After a little anxious waiting the cries seemed to be receding and finally died away. I think the first shouts must have come from a wounded Aka who wanted his friends to come and take him away. Then Dr. Grant with a *dhuli* and a small escort arrived and the wounded man was sent back to camp and we proceeded on our way. This was the last time our communications were attacked.

The jungle having been well cleared all round our camp, we commanded an excellent view of the opposite hills, the Aka path and stockade erected at the top where the path turned off east to Labi's and Mehdi's villages. Through our telescopes we could see the Akas every morning busily engaged in improving and strengthening the stockade, and passing up and down the road to the river. We might easily with our knowledge, thus acquired, have attacked them, and with success, without waiting, but we had our orders and we had to content ourselves with looking at them. There was one open spot on the road about half way down and here a few of them used generally to sit and watch us during the afternoon. Once we turned a heliotrope on them, and they fled to the bush, but finding no report followed the steady flash they brought out some strips of bamboo matting and putting it up as a shelter squatted behind it. Every evening as the sun went down and the light blue mists curling up from the valley mingled with the smoke of the Aka camp fires just beyond the stockade, they stood out in the open and firing one gun, shouted out a defiant good night.

In the meantime huts, hospitals and godowns had been erected at Diju Mukh, the materials for which are so abundant all over our N. E. Frontier, and a road had been constructed through the forest to No. 1 camp, all the little ravines and water-courses bridged and a pony could canter the whole way. A vast improvement on the river bed; with its break leg boulders and continual crossings of the icy stream.

On the 6th January the General arrived with the guns, and the 7th was spent in a final reconnaissance of the enemy's position with a view to selecting positions for our guns. On the 8th we passed down to the river quietly and unperceived, and found that the bridge had been destroyed and the jungle on the bank much cleared so as to afford us no shelter when collecting to force the passage of the river. So little were we expected by the Akas that through the leaves we could see them at work on some of their little breast-works only 200 yards away across the Tenga river. They laughed and chatted away as they carried down stones and put them in place, or drove in an extra bamboo now and then pausing to shoot an arrow into a tree, by way of practice, and also apparently as a declaration of their intentions towards us. A volley would have been in accordance with their own views of warfare and would have considerably surprised them, but General Hill did not wish to have a dress rehearsal of the fight, and had given strict orders to Colonel Madden, commanding the reconnaissance, not to exchange shots if it were possible to avoid it, and so we returned and finding, about 300 feet above the river, a good place for the guns, we cleared it of trees and undergrowth and found that it commanded all the river defences.

Attacking force

12th K-i-G. Regt.	50	Rifles
43rd A L.I Infy.	50	,,
Frontier Police. ...	10	,,

Support.

12th K-i-G Regt	50	Rifles
43rd A.L I. Infy.	50	,,

The next day January 8th at 8 A. M., the guns, with an escort of 50 men, took up the position assigned them; and the attacking party consisting of the troops named in the margin moved down to the river preceded by their supports who lined the river and covered the crossing. As soon as the infantry fire commenced, the guns opened on the stockades. In that deep and narrow valley the noise made by our little popguns was amazing, and the reverberations thundering up and down the valley would have made a stranger imagine that some very heavy artillery was at play. The effect was great on the savages and they only waited to pour a couple of volleys of arrows at our men as they rushed through the stream, in some places waist deep. Twelve men, mostly Kelat-i-Ghilzais were hit, nearly all in the feet but only three severely wounded, and whether it was that the arrows lost their poison in passing through boots and socks, or through water or perhaps that the stock of poison was exhausted, none of the cases proved fatal. So dense was the jungle that when our men had crossed

Fig. 6.

STOCKADE NEAR LABI'S VILLAGE.

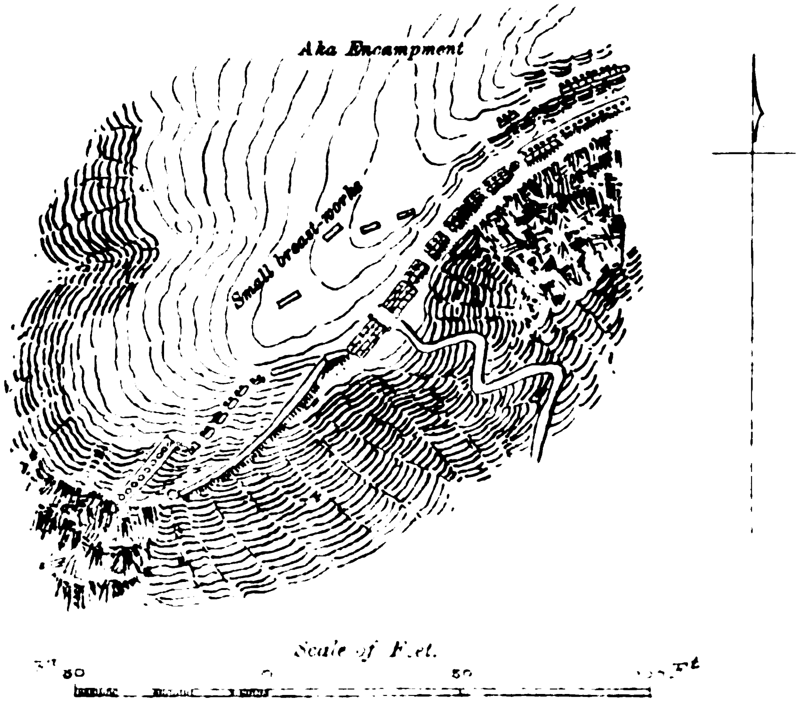
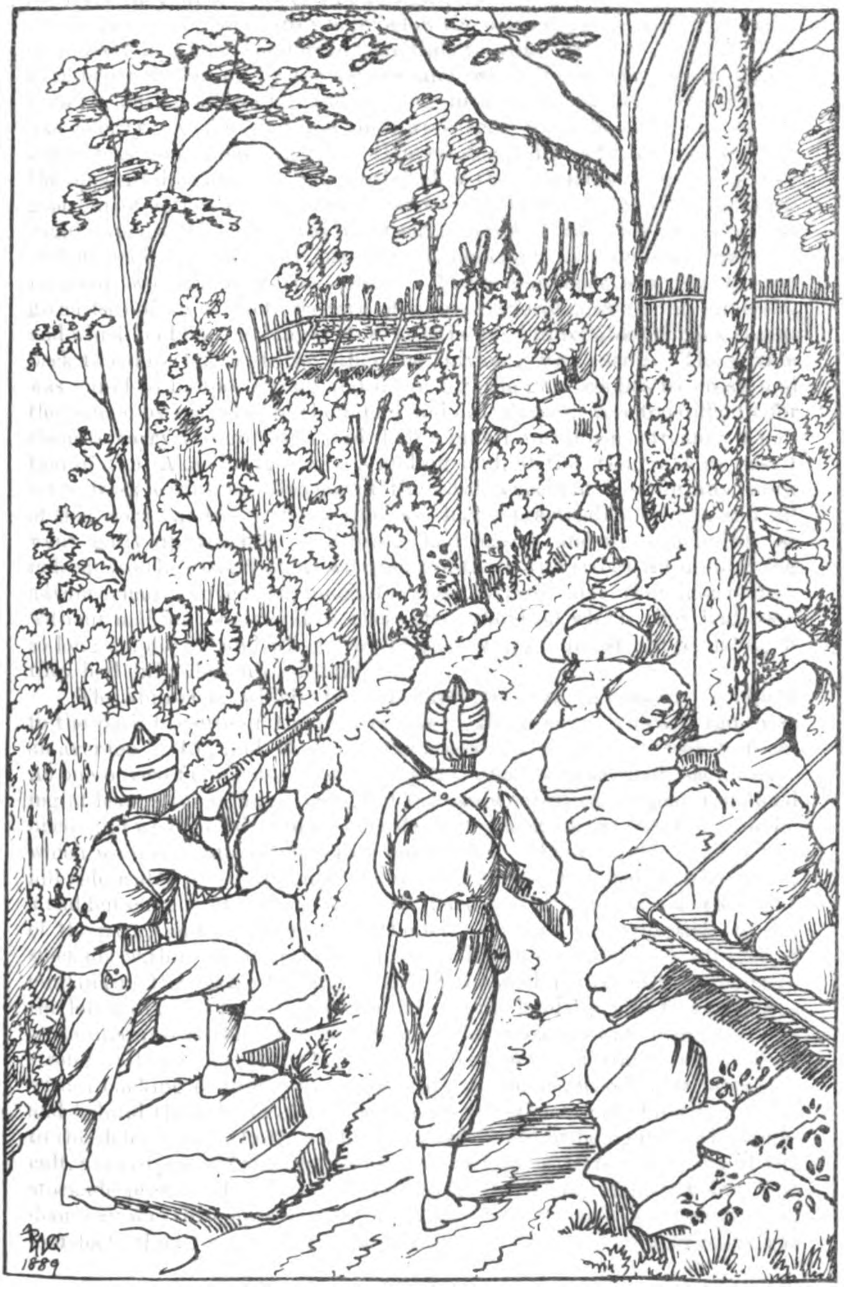


Fig. 7.



THE STOCKADE NEAR LABI'S VILLAGE.

12th K.-i-G.'s and 43rd G. L. I. attacking.

the river they were at once lost to sight, not a man, either of our own or the enemy, was visible anywhere below the main stockade, in which was a large body of Akas, reinforced from time to time by their friends who were being driven up by the sepoys, and whom we could see emerging from the bushes at the top and slipping into the stockade with lightning like celerity. A few shot and shell were sent towards them but as the range was somewhat great, the General decided to advance to a spot on the opposite hill about 1,200 yards below the stockade. One gun had gone out of action at the fourth round with a broken axle. (To save some slight expense, Capt. Shirres had been ordered to leave his own guns at Abbottabad and take only his gun detachment to Calcutta where he received two guns from the arsenal. The consequence was that he was given two of an obsolete pattern of whose performances he was ignorant, and which had been so long in store as to be quite unreliable). This was sent back to camp, but with the other the advance was made. The stream was found to be too strong and deep for the gun coolies to cross, and the banks, by reason of big boulders and fallen trees, were too difficult for them to carry the gun to a ford half a mile lower down stream: a portion of the Aka bridge was standing and, at the General's request I set to work with some Jharuas of the 43rd, excellent men for any work of this sort, and in a short time we had a practicable bridge, and all went gaily up the hill. All firing had ceased, and we concluded, as indeed was the case, that, as with most of these wild tribes, an unflinching advance had proved too much for their nerves, and they had bolted, without making one stand in their stronghold on which they had been so long employed and which would have proved almost impregnable, if they had only chosen to defend it.

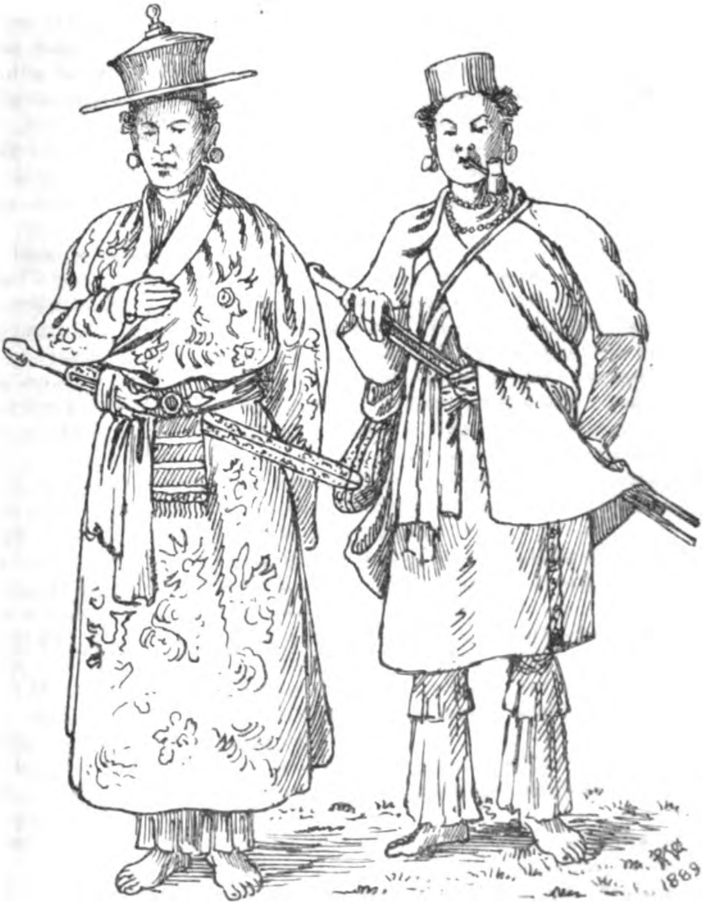
The approach, which, towards the top, was necessarily confined to the path because of the narrowness of the spur up which it ran, was an average of 45°, and the path was a series of steps from rock to rock. At one or two favourable spots booby traps had been erected, each carrying at least a ton of huge rocks, but the canes supporting them remained uncut and we escaped. I must here describe the stockade (see Figs. 6 & 7), which we now found occupied by our friends. Above and beyond it the hill side rolled away in gentle undulating slopes, but just at this point a sudden change of inclination took place and a landslip on the right of the path, and a precipice on the left, confined the approach to the stockade within the narrowest limits, and utterly precluded all idea of outflanking the work. The right flank of the work rested on the precipice; the left flank and a portion of the face on the landslip, and this part was quite unapproachable from the front. The stockade was composed of a strong wall of loose stones kept up in a framework of bamboo and timber, with a backing of thick timber uprights, loopholes were left at intervals, and behind these little cleared spaces or flat stones gave kneeling space to the defenders. On the right the ground in front being rather less difficult, a small *panjied* fencing, parallel to, and about 10 feet in front, of the stockade prevented the attacking party from reaching the loopholes. The door-way was through a very strong wall of heavy stones laid horizontally, four feet thick, seven feet high and 20 feet long. The door itself was only five feet six inches in height and two feet six inches wide and closed by heavy planks. Several big trees were skilfully taken advantage of to support the stockade, which was further strongly shored up. On the left where the ground was too steep to allow of this shoring, long, strong canes fastened to trees inside connected them with the stockade, assisting to hold it up. Unintentionally the walls of the smaller breastworks on the road up were constructed on an admirable principle for standing artillery fire. They were formed of loose stones kept up between open nettings of bamboo work held up by strong posts. The meshes were very open, and a shell as often as not passed through without cutting the bamboo; even if it did no serious damage was done. Moreover the stones being loose, though smashed by the shot or shell, settled down again and closed up the breach. Inside the stockade, on rising ground several large flat stones were fixed upright between posts, either as a sort of traverse against chance shots, or from some idea of making a stand even after we had forced an entrance. Huge piles of stones were collected near as missiles of war. It was saddening to think of all these elaborate preparations, and work of a month, thrown away without a blow being struck. The whole stockade was well *panjied* on the outside and especially round about the doorway, outside which was a curious little trident of split bamboo stuck in the ground, the prongs painted with a few black lines, and smeared with blood while the centre prong bore a tuft of the feathers of the fowl which had been sacrificed to secure some demon's protection of the entrance. Similar sacrifices had been offered at several places on the road up.

Passing through the stockade and among the little leafy bowers which had hitherto sheltered the Akas, the path ran round the hill side fairly level for about half a mile, when, turning the corner, Labi's village comes in sight on some gentle slopes at an elevation of 4,300 feet above the sea and beyond again, two miles, Mehdi's village. Neither of these contained more than three or four good houses, and a few smaller ones and granaries. They were deserted, nothing was left in them, and our Kelat-i-Ghilzais openly and loudly expressed their disappointment: as it appeared that in conversation with the *kotokis* over the camp fire, they had learnt that in each village lived three or four *rajas*, and not realising that there are *rajas* and *rajas*, had been indulging in visions of palaces and any amount of looting. We all put up in the various houses for the night. We had with us only a blanket each and a little cooked food, as the General did not know what opposition we might meet with, and so was unwilling to hamper the attack with a long line of baggage coolies.

On the 9th, a party of 100 rifles was detached to occupy Buragaon, (see Fig. 2), a village about five miles off; it was found to be literally buried in jungle, a good deal of it a nettle of a most virulent type, as some of us found to our cost in pursuing the wily *murghis* which were fluttering around their houses and wondering what had become of their masters. Pigs also abounded, and afforded great sport to my Khasia coolies, who, arming themselves with sticks, pursued them round about and under the

Fig. 8.

AKA CHIEFS.



MEHDI
(In Chinese robe).

DAPHU.

houses, upsetting each other in their wild dashes after the grunters and little squeakers and uttering fearful oaths as they went headlong into a clump of nettles. There were also many fine *mithun* about and a few were shot and made a welcome addition to our commissariat rations. As there was no camping ground and but a poor water supply, the force returned to Mehdi's village which was thenceforth occupied and commanded by Colonel Madden, with whom was Captain Maxwell.

The next ten days were occupied in negotiations for the surrender of the captives and guns taken by the Akas, and in endeavouring to get the headmen to come in for a conference. The survey party took the opportunity of visiting several prominent points and clearing them for topographical work, and managed to get in a large amount of country. We had hoped to have made several tours round about, and the General had sanctioned one or two, to last three or four days each, but much to our regret they were found to be inexpedient and we could only sit like Moses on Pisgah, and gaze wistfully into that land which we could not visit.

One of the Aka chiefs, Daphu, (see Fig. 8), came in on the 16th and the next day he returned with the two captives, who expressed themselves over-joyed at being once more among friends, though on enquiry it was found that they had not been badly treated. They were housed with the chief, and their only privation was, as they said themselves, "we are not getting any fat stuffs with our foodings, therefore getting too much thin." The young women used to look after them, and the night before they marched back they gave an Aka dance in their honour, and the best looking of the *babus* said that some wept as they said good-bye to them. I doubt it. The *babus* told us that when the Akas gather round the fire in the long evenings they are fond of recounting tales and legends; the *babus* brought away two with them.

1.—A tribe dwells under the Snowy Range the members of which have such immense ears that they are able to use one ear as a mattress to sleep on while they cover themselves with the other.

2.—Another tribe also under under the Snows (an unknown land to the Akas in which anything strange might find a home) are distinguished by the possession of two small horns on their foreheads and a little tail. These peoples kill and eat their old relations when they consider that they have lived long enough.

Both of these tales seem to have a somewhat familiar air about them and my classical friends tell me that Herodotus mentions something very like them.

Chandi and some other chiefs came within two or three miles of camp, but their hearts failed them, and it was said the omens were unfavourable. The guns and rifles were delivered up on the 18th and 19th respectively, and all persuasions having failed to induce any of the other chiefs to come in, and the chances of their surrendering themselves within any reasonable time, or at all, being very small, it was settled that the 20th should be devoted to sending out two parties, one to burn Chandi's village in accordance with a warning which had been given to him if he refused to surrender; and the other to visit

Koagaon, the village where the *mauzadar* (Lakhidar) was said to have died, to exhume and identify the body, as far as could be, and to ascertain if there were any signs of his having been murdered. The first party met with no opposition and saw no one; the other was met by Daphu and received a friendly welcome from the villagers. The women and children were conspicuous by their absence, having been removed, as is the custom over all the N. E. Frontier, when hostilities are expected. The cage in which the *mauzadar* had been confined was pointed out, his body was identified, and the stocks in which his legs were confined were found by his servant who went with the party.

The Commander-in-Chief's instructions to General Hill were that when the two captives were recovered, the objects of the expedition were to be considered to have been attained, and the force was not to be detained a day longer in the hills for mere survey purposes, and so in accordance with these instructions the return march began on the 21st. The General with the guns and the detachments from Mehdi's village left for the plains by the main route. On the 22nd Major Beresford with a party of 100 men started to march back by the Bhoreli river through the Hazara Khoa country. Daphu accompanied them. They encamped at Jamirigaon for one day for the convenience of the survey and were well received. The road was found to be quite practicable and the advance might have been made by this route and in less time than by the direct road. We had then no knowledge of it, and the gun coolies would probably have found it too difficult for them.

A very good floating bridge over the Maj Bhoreli had been constructed by the sappers,* and no delays occurred on the return journey and the last of the troops and stores reached Diju Mukh on the 29th January, and Tezpur on the 10th February.

There was a good deal of sickness among troops and followers, fever and pneumonia being the most prevalent; the men who were likely to be ill more than two or three days were sent back to be treated at the base hospital.

The results of the expedition were not all that could be wished; the Akas had not been taught the lesson they required, and they gave a good deal of trouble afterwards, and their chiefs could not be induced to come to terms. It was a mistake to retire when we did. By remaining longer and exploring the whole of the country, we should have compelled the chiefs to come in. As it was, they thought, although we had penetrated into their hills, that we were afraid to go any further; and as an amusing termination to the negotiations, they threatened to sue the General before the Chief Commissioner for the damage he had done to their villages and cattle.

The moral to be deduced from the expedition is; firstly, that it is impossible in this sort of country to "surprise" the inhabitants, especially, when, as in this case, we have so little information about the

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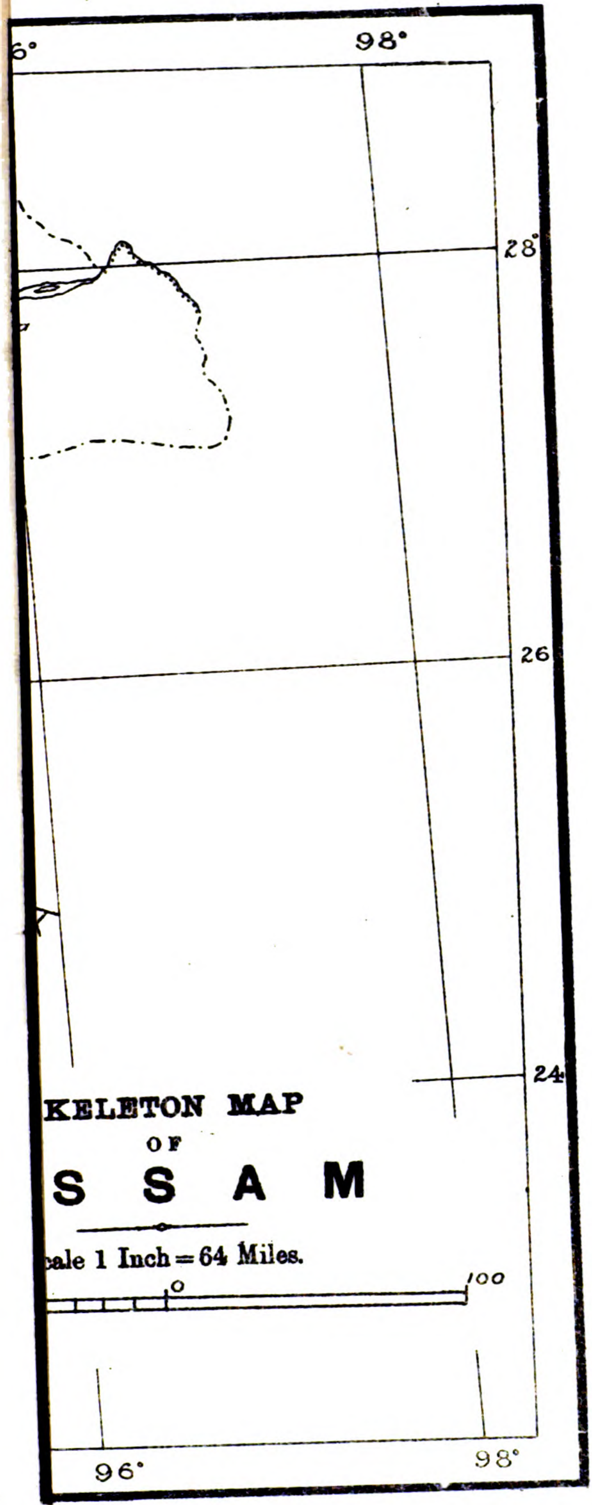
* They had a good deal of trouble with this bridge as they had come up without bridging material or even wire rope, not having been warned, as indeed they could hardly have been, of the difficulties before them at the Maj Bhoreli: and had consequently to rely on the resources of the jungle, canes and bamboos.



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difficulties likely to be met with. The *kotokis* travelling lightly and in small parties, could trudge along, or swing themselves over the Aka bridge without any trouble, and had no idea of the difficulties which a well equipped force, however small, would experience on the same route. Secondly, that a force should not start till everything is in working order, and especially the commissariat. As we have seen, nothing was really gained by our early start; possibly even, our work would, in the end, have been done quicker, had we waited a few days longer. Thirdly, that we should not consider that any thing is good enough for an expedition against savages, and imitate "the everlasting nigger who sold the the nutmegs made of wood, the clocks that would not figure," by fitting out our gunners with old guns which go out of action after the first round, thereby destroying the confidence of the men in the weapons they have to use.

Tuesday, August 20, 1889.
BRIGADIER GENERAL G. LUCK, C. B.,
Inspector-General of Cavalry, in the Chair.

HORSE BREEDING OPERATIONS.

BY MR. J. H. COX,
Army Veterinary Department.

The **CHAIRMAN** : Your Excellency and Gentlemen.—The lecture to be given this afternoon is one of a series on veterinary subjects that have been going on for the last two or three months, and which many of us have been attending. The subject of the present lecture is full of interest to all who keep horses, and consequently the members of this Institution have been asked to attend to-day and bring their friends with them. The lecturer is one of the ablest members of his department; he has had great experience in the subject with which he deals, gathered from personal observations in the United Kingdom, France, America, Canada, South Africa and in this country. I beg to introduce him to this meeting, and would ask him to proceed with his lecture.

Mr. Cox : For the convenience of description and discussion I shall divide my subject into the following heads :—

(1) Old stud operations. (2) General Parrott's system. (3) Sires. (4) Dams. (5) Zemindari system. (6) Stud farms and Nurseries.

In placing before you the following remarks I claim to have had some considerable experience in these matters. Experience not only in the United Kingdom and this country, but in America, Canada, South Africa and other countries. Experience also as a breeder myself and from having been associated with horse raisers all my life; *ergo*, what I have to say will at least be free from bias.

It is not so much with reference to ordinary breeding as carried on as a commercial enterprize to which I wish to draw your attention, although I shall touch upon this subject, but more from an official point of view.

Sometime ago I issued a pamphlet on the subject of horse breeding operations in this country and Cape horses for the Indian army, which doubtless some of you have perused. As some of the remarks in that pamphlet bear so closely upon our present subject I shall occasionally make extracts from it.

Horse breeding is a somewhat vexed question all over the world, that is, many embark in the enterprize and failure has to be written across every page of the book; whilst others we know succeed. We are aware that in this country the path has not always been down that broad way which leads to success. Opinions are divided as to certain policies which have in the past been carried out; nor do we find in the present day that public opinion is unanimous regarding the measures which have been promulgated and are now being worked out on lines of which you are all cognizant.

Old Stud Operations.

The first point to which I shall direct your attention is what is called the "old stud operations." I have been at some considerable trouble to unravel what may be called the mysteries of that gigantic undertaking. I have searched record after record to satisfy myself why failure should have been so pronounced. I have placed the workings of the old studs side by side with my own experience and that of others, and it amounts simply to this: that it was not impossible to breed useful horses, but that the organization was faulty in the extreme. It was faulty because horses could not be raised at a price remunerative to Government. Now there must have been some reasons for these short-comings, but it is not for me to delineate these reasons, they are doubtless well known to many here. Horse raising in all countries is so finely cut and drawn that it will not admit of elaborate organization. I am not alluding to blood stock for the turf, but to the general utility horse. Horse raising in England and indeed in every other country to be a paying concern must be backed up by two principal things (1) skill which begets luck and (2) economy. The skill, or intuitive knowledge, enhanced by careful observations which lead men to do the right thing at the right moment, and not the "hit or miss principle," which characterizes the actions of many, and then trust to Providence for results. Economy, inasmuch as the outlay of every penny must be watched. A colt can never pay his way if every limb of his body is mortgaged the moment he is dropped. Private enterprize cannot afford to ignore these fundamental principles in horse-breeding; nor can any combination afford it, be it Government or not. I have been a breeder myself and know to a farthing what it costs to raise a horse and make him fit for the market, and I tell you that there is no *margin for waste.* What then applies to Yorkshire in England, has reference to this country. At the same time horses can be reared at a profit if the knowledge of mating is understood, and it is a science which few do understand. If it be possible for one man to produce horses at remunerative prices, and I know many who can, it is possible for others to have the same share of success meted out to them. My experience tells me, and I have gone closely into the question in various parts of the world, that it is entirely one of management. I have seen failures running parallel with success, and only a hedge-row dividing the two. How comes it then that success should attend the efforts of one and not the other. They both work under similar conditions of soil and climate. The reason is that one knows his book and the other does not.

Horse raising is as much a science, as other sciences which are daily multiplying and figuring on the stage of life, and many people foolishly imagine that when they undertake an enterprize of this nature, they have only to introduce the three factors or motive springs, *i. e.*, capital, sires and dams, and the results will be in accordance with their wishes. That nature never makes mistakes is an old saying, she works out her plan on carefully mapped lines. Hence it is that those who possess the intuitive knowledge of mating, (for this is the pivot of success) elaborated by careful observations and practice, come to the front and make horse-breeding pay.

Horse breeding then either as a private or an official enterprize can be made a success if conducted by men who are conversant with every detail, but not by those who do not know or understand any of its principles. These are the men who go to the wall. You must have experienced men at the back of such enterprizes otherwise they will be drawn blank.

It seems inconceivable to me why stud operations in this country, if carried out in a manner I shall indicate, should not pay. It is true that in some instances atmospherical and other conditions are adverse to the rearing of good stock. But unfavorable conditions of this nature should be avoided, as I take it there are districts fulfilling every requirement. To conduct stud operations successfully we require a combination of factors none of which must be absent or defective, otherwise the weak points will most assuredly develope themselves. This combination embraces men who know the ins and outs of breeding and rearing and above all the science of mating. I do not mean the recognition only of the various strains suitable for crossing, but also the different points of animal mechanism which when brought together result in something good and useful, and not the monstrosities which we frequently observe in this country, and which are defective from head to tail.

In breeding for the turf we have to consider stout running blood and the probable results which would accrue from the admixture of the various qualifications which are essential to success on the turf. The late Mr. Blenkiron was an expert in this particular, but his mantle has not fallen or either of his sons. The late Admiral Rous was an adept at this game. Sir Tatton Sykes knew and understood the vagaries of that subtle influence known under the name of crossing. The late Sir Joseph Hawley was another instance of intuitive ability. Old "Fred" Taylor of the *Sportsman*, the best judge of young blood stock in the world, could tabulate in chronological order the various strains which were fitted for each other. This is not only intuitive in such men, but requires long experience. It is a fascinating study and one on which I should like to dwell. But this is not the opportunity for giving a dissertation on the principles, the scientific principles, of mating. It may, however, be accepted as the primary and most essential feature in all breeding. So much has to be worked out on scientific lines, so much to be understood as to the individual capacities of both sire and dam to generate their good points or eliminate bad ones, the excellencies of the one to overcome the deficiences of the other, that it would require quite a volume to itself to pourtray what experience, skill and intuitive knowledge have opened out to us. To quote the expression of a well known authority, "the science and art of breeding demand the utmost industry, skill, observation and patience, in short, all the fine qualities of the human mind."

Given the men who have this thorough knowledge of these principles we come to the other items in the programme of success. That is, the opportunity for exercising their ability, and the demand for products.

I take it that in this country there is ample scope for genius and for private enterprize. The modes of operation I shall presently describe, as for the demand for products this is always in the ascendant, for outside the area of the army I do not know where at the present moment I could put my hands on a dozen what I call really good horses for sale, that is, with fashion, symmetry, manners and up to weight, and such as we could find in large dealers yards in England and Ireland. This conclusively proves to us that there is a dearth of good horses in this country, and therefore a great demand exists. Almost daily I am asked to recommend charger-like looking horses, but my answer is always the same "not to be found." I can introduce my friends to a certain number of knock-kneed country-breds or long-backed coarse-headed Walers. But the horse of the heavy weight blood hunter type is a *rara avis*. It is true that, in the shipping season, Calcutta and other centres afford opportunities for pick-up the raw material; but this is not the class of stuff every one requires. It is not so much that good horses are not and cannot be bred in this country, it is that the demand is greater than the supply, and when the requirements of the army and the demand for Native States have been satisfied, if ever they are, nothing but the scum remains.

General Parrott's System.

At this stage I should like to offer a few remarks about General Parrott and his system. I am an admirer of the General inasmuch as he has demonstrated to us what can be done by good management, &c. He inaugurated his venture on certain principles. What his motives were we need not here discuss. He has, at any rate, succeeded in proving that he had means at his disposal and the genius to carry them out to a fruitful termination, inasmuch as he has improved the breed of horses and produced stock which can more than hold its own in the class which it represents. This much he has demonstrated and we must congratulate him upon his efforts. That some of his horses are good equine specimens and with a rare turn of speed none of us can deny. But take his stock generally, are they fitted for the ordinary requirements for which horse-breeding operations were instituted, that is, are they able to carry heavy dragoons or take their place in a gun. I do not think they are.

We come now to the financial aspect of his undertaking. The prices he realizes are fancy ones. A few hundred rupees in a horse which can gallop and catch the judge's eye are of no moment. The ability of his horses to beat the record is what turfites study. Further he sells part of his stock as youngsters and realizes more for good sound animals than Government can afford to pay. He thus saves one or two years' keep, and the accidents incidental to coltish life (and they are numerous) are minimized, and the all round average is raised. We do not blame the General. This is business. But supposing several other large studs of a like nature were started in this country—as advocated by some, where would the General's all round average be? Under existing circumstances he has virtually a monopoly of this kind of trade—a trade which is necessarily very restricted in this country, for we do not all require race-horses. Further the General started his venture under auspices such as no other man or combination of men can ever hope to possess. Let opposition studs once spring up and I am afraid that the General's balance would be on the wrong side. People forget these minor details when they advocate the formation of studs on such lines. If they would only show us how to breed general utility horses at a profit, they would be conferring a benefit on the State and the community at large. We see and read of the best horses raised at Karnal; but the weeds, the misfits and the screws which always form part and parcel of every establishment of this nature, and which cause many moments of anxiety, are not mentioned.

Sires.

I will now describe the different kind of sires. And in generalizing on this subject I would state that there are always two cardinal points to bear in mind. (1) Although a horse may be put together on true lines, may have the bluest blood running in his veins; yet by some unaccountable reason these good attributes are not always reproduced in the offspring. We know this from experience, and are at a loss to trace these shortcomings to any defects in conformation, or to want of fashion in pedigree. An occurrence of this nature is not the rule, providing the dam is also well shaped and bred on true lines; but still it has to be borne in mind. (2) We know that horses have a predisposition to disease by reason of hereditary taint. And although a sire may be passed to-day as being in every way suitable for stock purposes, six months afterwards he might be condemned by the merest tyro as unfitted for his calling in life. This frequently happens in exhibition horses and a great deal of wrangling in consequence takes place. I myself have been a judge at such shows, and have been professionally attached to committees to adjudicate on the soundness of horses exhibited as sires, and it has been a disagreeable duty for me, on some occasions, to reject animals which have not long before been passed and have taken prizes. I cannot on this occasion go into the question of hereditary predisposition, this has already been placed before the members of this class. I may, however, state that certain ailments are developed at certain periods of life, or I should say there is a greater predisposition. Horses up to five or six years old are more prone to bony formations or exostoses, as splints, spavins, ring-bones, &c., than are older animals. The same may be said of diseases of the respiratory organs. So that although a horse when purchased as a three or four year old for stock purposes, may to all intents and purposes be sound, yet with advancing years he is liable to develope some of the diseases which I have enumerated, and which are as surely transmitted as day succeeds night. I wish to specially direct your attention to this point, for on this hangs the primary principle of breeding so far as the sire is concerned. We find this to be true in all spheres of horse breeding, be it for the turf, the road, or for cross country purposes, and at the present moment hundreds of sires are receiving patronage and are thus transmitting their defects from day to day owing to negligence in this particular. I have given this subject very serious attention, and the line I have drawn is one which I think will meet the case, and it is this: all stock horses should be periodically examined until they are seven years old; if at this time they are free from disease likely to be transmitted, they may be considered eligible for future use. There are exceptions and disease of hereditary nature may subsequently make its appearance. The line, however, I have adopted is a broad one and will meet most cases. As a rule what happens subsequently to this period may be put down to accidental circumstances, providing, of course, that his mode of life has been the same.' It may be said that a principle of this kind, if carried out in its entirety, would entail considerable loss by eliminating from our stock yards all unsound horses, but the loss I maintain would be more than counter-balanced by the purity and soundness of the offspring. It is this false principle of economy which has stocked England with screws. I have found these unsound stud horses all over the world, and horse breeding operations in this country will never be the success they ought to be if this principle of weeding out is ignored. In like manner, if it be found that the offspring of certain sires do not approach the standard for which they (the sires) were purchased, get rid of them and replace them by others.

The Arab Sire.

The first sire to which I shall direct your attention is that impostor of the stock yard the Arab or the child of the desert as he is sometimes designated. A great deal has been written regarding the superiority of the Arab. Considerable sums of money have been squandered in endeavouring to prove that he is the emblem of equine excellence. Men have grown grey in their attempts to trace that our present generation of horses owe their superiority to the admixture of Arab blood. But all to no purpose. If we follow Captain Upton in his "Newmarket and Arabia," we shall at once come to the conclusion that the Arab is the personification of everything which is good, noble and true, and that all the good traits of character inherent in our present stock are the transmitted qualities of this child of the desert. Breeders have blindly followed the *dicta* laid down by such men as Captain Upton, and, to use an Americanism, I guess they are sorry for themselves.

Let us briefly take a retrospective view of the transcendental merits of this horse. To do this we must go back to the era when Captain Byerly's "Turk," Darley's "Arabian" and Lord Godolphin's "Arab" were before the British public *i. e.*, between the years 1690 and 1730. Now it so happens that at that time the improvement of our horses was receiving a large amount of public attention; a revival, if I may so term it, had taken place and anything which tended to advance the horsey interests in this particular was seized upon by horse raisers. These children of the desert came with a great reputation, enhanced doubtless by the vapourings of the "wise men of the east." The advanced breeder in those days embraced this as a fitting opportunity to improve his stock by crossing this Arab strain with the indigenous English and other mares. The results were superficially successful. I state superficially because I am one of those who do not believe in the lauded qualifications of the Arab. Let us take a common sense view of this question. Long before the time of the Godolphin Arab other horses of the same class were imported, notably Mr. Markham's "Arabian," for which the long price, in those days, of £500 was paid. The half-hearted manner in which breeding was carried on did not enable these horses to leave their impress on the stock, in other words nothing of note was recorded. Again all subsequent efforts on the part of breeders to improve their stock by the introduction of Arab blood have signally failed, yet large numbers have, from time to time, been imported for this purpose. It was only at this period, or during the career of Lord Godolphin's horse, that any success seemed to be apparent. This I maintain was due to several causes. The inherent good qualifications of the dams, the interest which had been awakened in the horse breeding community, and the science brought to bear in crossing—a science which has been to the fore ever since. If not, how is it that all efforts anterior and subsequent to this time have proved so futile? The natural inference is that if the Arab possessed the excellencies his admirers make him out to have, he would permanently register his mark on the produce; but such we know is not the case. Every opportunity has been given him for asserting his superiority, but he sinks lower in the scale every day. Large sums of money have been spent in this way, the best blood has been selected, but with one result, *failure.* The stimulus to breeding to which I have alluded as being evident in the last century was not confined to horses for the turf, but it extended to others, and to-day we are possessed of horses which cannot anywhere be excelled, yet many of these animals have little or no chronological connection with the Arab. We might as well say that Booth's short horns, our Leicester sheep, Berkshire pigs, Bullock's cockers or any other species of dog are the result of some foreign cross. Yet compare these animals of to-day with those of the era to which I have alluded—I maintain that the Arab has been and always will be a stud failure. I have myself been professionally connected with an Arab stud for upwards of six years, a stud consisting not only of Arab sires but of Arab dams; and they never produced anything whose market price reached more than £50, yet the stud was skilfully managed and no expense spared. The same results have been chronicled in other parts of England. The same cry emanates from Australia, America, South Africa, France, Germany and Austria, and I have yet to learn that in India we are any better off. What then does this teach us? that the Arab for stud purposes is, what I have designated him, an impostor.

The qualifications of Arabs as horses *per se* have been paraded before us as being worthy of recognition. I admit that there are some good class specimens of the equine race; but as compared with what can be produced in England, Australia, America and even South Africa they fall lamentably short in every day requirements. In all trials of speed and endurance they have been woefully beaten by our common English platers, beaten in England, beaten on their own soil, beaten everywhere; and in this country we know that they cannot be brought together with good class Walers. Such being the case, why resort to such an animal for stud purposes? an animal which, at its best, can only produce a pony, a native cavalry trooper, or a lady's hack. They have not the physical fitness to generate horses either for British cavalry or artillery. Their peacocky appearance may be in accordance with native ideas or those of the "wise men of the east," but I take it that the aims and objects of horse breeding operations in this country are placed on a higher platform than this. Presuming, for the sake of argument that the merits of the famous "Eclipse," "Flying Childers," &c., were directly the result of the Arab cross, it does not convey much; for these horses were not the wonders they are made out to be. Practical men know better than this. Further, whatever degree of merit, in comparison with our English horses, the Arab formerly possessed as a stock horse, it is self-evident that in the present day he is played out, despite what Mr. Blunt or any one else may say to the contrary. These are not my views only, but are those of men like Admiral Rous, Sir Joseph Hawley, William Day, &c.

The Country-bred Sire.

The country-bred sire next claims our attention. Whether or not he be a suitable stock horse for this country depends upon circumstances. I know the idea has been entertained that such a horse can be so bred and reared as to form a good substitute for other stud horses. I should regret very much to think that such a contingency could not happen. But considering in what a backward state horse breeding is in this country, I do not think that we can afford to run the risk of, what might turn out to be, any retrograde movement. With mares indigenous to this country, my own opinion is, that we should always mate them with foreign blood. We cannot forget that the climate is in itself a prodisponent to weed. This forcibly applies to, and is intensified in, successive generations in both animal and vegetable life. So to avoid any chance of this being exemplified in horse breeding operations it is better to trust to foreign blood for our sires.

If a country-bred horse possesses all the essential features to successful stock getting, as shape, make and breeding, one "cast" may be indulged in. If, however, the dams be English or Australian, and what dams ought to be, then we might possibly resort to the country-bred for a change. But the broad principle underlying success is the introduction of foreign blood. The argument that it is cheaper to make use of the country-bred sire partakes of the penny wise and pound foolish adage, money saved in purchasing inferior sires and dams is immediately lost in the offspring. The principle is bad.

The Australian Sire.

We come now to the Australian horse as a sire. By this I allude to the thorough-bred as recognized in Australia. Without attributing anything derogatory to the horse shipping interest, I cannot help thinking that some of the pedigrees given to horses are "salt water" ones. I may, of course, be wrong. But all I can say is that often they do not show their breeding, not but that it is possible to obtain really reliable information on this point, and if the leading shippers care to guarantee the purity of the stock they sell it can be relied upon.

The Australian thorough-bred is first cousin to the English thorough-bred. Indeed all the excellencies of the Australian as well as the horses of most other countries are due to the admixture of English blood. We know that for years past the colonies have been importing very largely from England, and are beginning to take quite a front position in all matters relating to horse raising.

There cannot be any doubt that the Australian is a valuable sire. The real pedigree horse I mean. In his veins courses our best English blood. In addition to which he is not so subject to hereditary diseases which render some of our English horses so undesirable as sires.

The English Thorough-bred.

Allow me now to discuss the English thorough-bred as a stock horse. The use of thorough-bred horses in England is entirely, so far as the turf is concerned a question of fashion brought about by the winning amounts credited to their sons and daughters; and year by year this changes. "Hermit" has maintained his supremacy for years. "Hampton" who was considered nothing more than a good plater has had a very successful career. The performances of that little wonder, "The Bard," drew increased attention to "Petrarch". "Phil's" performances as a two year old in the "Champagne Stakes" and his subsequent effort in the "Two Thousand" set the ball rolling in "Philammon's" favor and increased his fee from fifteen to fifty guineas and a full list. The unbeaten "St. Simon" looks like successfully perpetuating his name, as two of his first season's offsping are now before the public with almost an unbeaten certificate. This is a particularly fascinating study and one on which I should like to elaborate; but I am not here to discuss the value of this or that running blood. William Day in his book on "Horse Breeding" says that all thorough-breds are well bred enough for getting hunters. By this he means clean bred enough, as far as blood goes he is correct, but I take it we want other qualifications besides mere length of pedigree to carry a heavy dragoon.

I give place to no man in my love for the English thorough-bred. But for army purposes, we can have a great deal too much breed, developing into spindle shanks, knock knees, twisted feltlocks and split up behind like a brace of guide posts, in short, with only their pluck to pull them through; and are in consequence absolutely killed by it in their efforts to do what defective conformation and want of physical power never intended they should have to perform. There is the happy medium between too much breed with its tendency to weed, and too little with its converse of coarseness. Whilst admitting the value of blood, I am quite convinced that the thorough-bred is unsuited to the weedy mare of this country, no science can bring them together and expect a general utility horse. I dearly love a good bred one, but we cannot shut our eyes to some of his faults, which he has the knack of transmitting. I shall have more to say of this class of sire when speaking of dams, so will proceed to discuss

The Real Norfolk Trotter.

For this purpose I cannot do better than give an extract from my pamphlet.

"What is a Norfolk trotter? A horse with a commanding appearance, having every essentiality for getting troopers, or at any rate producing offspring from which troopers could or ought to be readily obtained. He has a lineage dating back for a long period, and in his own class possesses features as distinctive and well marked as the thorough-bred. There is nothing common in him, his action, his big bony limbs, broad flat knees and large powerful hock, and his mode of comporting himself are as taking as any horse in the world. His style of going is in accordance with all the true principles of horse mechanism, and would electrify even old Moorcroft. This is the trotter I know, and have been accustomed to breed from and look at with pride; not the hairy bellies called trotters, and which nine times out of ten are the produce of a nondescript or mongrel, straining back to the shire horse with his preponderance of hair the excellence of which is recognised by the amount produced on limb and forelock. A trotter of this description is a misnomer, a mockery of the real Norfolk trotter with his ancestral lineage. Norfolk trotters require no "faking." In their own class they are natural gentlemen of the equine race. Are we to understand that horses of this description, with grand shoulders, back and loins, deep quarters and big sinewy legs devoid of carthorse hair and like bars of steel wrapped in silk velvet, and showing *all* quality in their heads, can deteriorate the stock of this country!"

The above is a fair description of the real Norfolk trotter like old "Bedford Phenomenon," "Young Pretender," "Denmark," and "Child of Mist," and I have no hesitation in stating that a horse of this description is the only one which can put bone and substance into the produce of the mare of this country.

The Spurious Norfolk Trotter. "The Faked one." "The Logged one."

Following all successful undertakings, articles of a spurious nature are sure to spring up. We have quack doctors both for man and beast, and all the ailments to which we are liable can be circumvented by one bottle of medicine or one box of pills. Spurious articles abound in every profession and trade. Trade marks, brands and literature are all pirated; and the patent and copyright laws are powerless in preventing it. The gullible British public are the victims.

Many are the arts to which some men resort in their dealings with horses. One result being the "spurious Norfolk trotter." The demand of late years for this useful animal has induced men to produce this spurious article, and so clever are they at this game there is little wonder that the average man is deceived. A trotter of this description has no relation whatever to the genuine article. He is almost as far removed as a donkey is from a race-horse; yet he finds ready sale. How is this "faked one," this "logged one" bred? Either he is the cross of the various hairy legged ones, or what is oftener the case, that of the Norfolk trotter stamp with the "first remove" from a cart-house. Is there, I ask you, any purity in this mingling up of incongruous elements, and what are we to expect when we call upon such mongrels to re-produce themselves in the stock yard. These flash non-staying movers cannot generate that which they do not possess. The process of "faking" and of "logging" may give them the semblance of the real article, they are manipulated in such a way that nature almost forgets to assert herself; but the leopard cannot change its spots nor can the manipulating dexterity of this astute division deceive the practical man. They may "log," "fake" and keep them enveloped in twenty blankets, and not allow them to see day-light until they are brought out for inspection, when every pebble looks like a huge boulder to their distorted vision. But there is always something about them which does not fill the eye, and which a judge soon discovers. Remove these horses from the fostering care of these experts and what happens? They soon come out in their true colors and they ought to be placed in their true position, *i. e.* at the side of a plough or in a grocer's van, for this is all for which they are fit. Time is so important that I must leave the "coper" and his tricks and discuss the next part of our subject.

The Dam.

And a very important one it is. I have long held the opinion that the mare plays an equal part with the sire in the production of good stock, and in many instances asserts her supremacy. It has been a mysterious thing to me why some men I know should have so steadily ignored the dam's qualifications; for there cannot be two opinions about the part she plays. To mate the thorough-bred with the *ordinary dam of this country* is at once inviting failure; it cannot possibly be otherwise. General Parrott I take it has the best class mare to be found in India; yet, as I have already explained, his stock do not attain the heavy cavalry or artillery standard, even with all the skill and master mind of the General at the wheel, and knowing as he does how to make the most of them. What then are we to expect from the ordinary mare as found throughout the length and breadth of this country when crossed with the thorough-bred and coupled with native ideas of rearing! I am addressing a body of horsemen and I ask you to picture to yourselves the three-cornered, knock-kneed, slab-sided apologies for horses which must accrue as the result of this cross. Let us draw upon our experience in England. There breeding is carried out on all the best known principles, and with the concomitant advantages of climate and skilled experience; yet the tendency is for stock to grow up light even from the grand class of mare we know exists there. We discover this to our cost when we want a horse up to weight with hounds. This is fully recognized and measures are taken to correct these defects by the infusion of more bone and substance. If this be true of England, what may I ask is the natural sequence in this country where thorough-breds are crossed with the ordinary dams. Weeds and nothing else, useless appendages to any stable! The British army is not remounted from blood stock yards, it is true that there are some like old Ben Battle's son—"Bendigo" or Lord Lyon's magnificent representative—"Minting" which could take their place in a gun or carry the heaviest dragoon, but these are the giants of the stud farm and not the ordinary ruck. Further these horses from their birth are forced to the highest degree, they are literally stuffed with the best of food and every advantage is afforded them in order to attain size and substance, I know it from experience; yet how many reach "Bendigo's" or "Minting's" proportions. Look at the thousands of knock-kneed weeds which are scarcely able to carry a pair of boots much more an average man; *nevertheless the dams from which they spring are a long way superior to anything which we have in India.* If then at such establishments we can only occasionally find horses with bone and substance enough for army purposes—and with all the advantages of science, climate, food, &c., brought to bear to ensure the best results, *what a miserable attempt it must be in this country with bad mares, bad climate and dams half starved into the bargain!* It is astonishing to me that two opinions can exist on this subject.

The ordinary horse raiser in England pursues other methods. He resorts to the big, bony roomy mare such as we find at York, Lincoln, Tengely and Horncastle fairs. He brings skill and experience to bear and mates them with horses best suited for their requirements, be it Norfolk trotter, Yorkshire coaching stallion, or the heavy weight blood hunter type; but to the weedy five furlong thorough-bred he gives a wide berth, and we know the result. It amounts to this that the mare is the fundamental principle on which all sound breeding rests. For years both with my pen and voice, in England, America, South Africa, in short on every possible occasion have I strenuously opposed this suicidal policy of ignoring the mare's qualifications. Ever since I could walk have I seen strings of our best mares being led away by the foreigner or his tout. This free trade in English brood mares has very materially crippled English horse raising. And now we discover that a "Hunters' Improvement Association" is necessary. As one of the original members of this association I publicly pressed the claims of the dam and showed how we were "killing the goose which laid the golden egg." My cry has been, "export as many sires as you like but save our mares." This is the reason why Ireland can compete with us so favorably and give us such good horses. The short-sighted Englishman has sold his old love, the brood mare, the bait held out by the foreigner has been too much for him. Not so with our friend of the "Green Isle", he would sooner part with his right hand than his old brood mare; and what is the result?—we have to depend on Ireland to a large extent for our best horses.

The system of branding mares in this country is an excellent one, but experience and judgment are of vital importance. I am told that there is great difficulty in finding suitable mares, and in order to encourage breeding all sorts have to be branded. The fact that there is strength in numbers may be correct, but personally I prefer quality to quantity.

I will conclude this part of my subject by giving a quotation from William Day's book on "Horse Breeding." Mr. Day has had a life-long experience and has been amongst thorough-bred stock all his life. Speaking of hunters and troop horses be states "generally the dam is either got by a thorough-bred horse out of a shapely half-bred mare, *or as is more frequently the case, she is the produce of a thorough-bred mare by a half-bred stallion. Some of them are by good trotting horses.*" What does this mean!

The Zemindari System.

I will now turn my attention to the system in operation at the present time in this country. In the first place I may state that Mr. Hallen is undoubtedly correct in his advocacy of the Norfolk trotter. Whether or not we get the spurious article out here is another question, and it is not for me to say. These horses are bought in England and shipped to this country under presumably good supervision. I repeat that the horse of the Norfolk trotter class is the only one which can put bone and substance into the off-spring of this country. But we are asking an impossible thing from this or any other side to demonstrate his true qualities owing to the wretched manner in which horses are reared. A horse is made or marred by the time he is coming three years old, and what care, may I ask, do natives generally take of their young stock? The principle that to "get it out you must first put it in" is not understood in this country as in others. *Ergo,* horses never reach that pristine condition which we are accustomed to see in other countries where this detail in management forms a leading feature. Once a horse's development is stunted, no amount of feeding, speaking generally, will recover lost growth. This abortive experiment of keeping young stock in the hands of the breeders of this country will never pay I am sure. Further the nature of this country is totally opposed to anything like full development of young stock. Who on earth expects a young colt to furnish if he has not his freedom? The miserable dens in which they are too often confined are not conducive to the perfecting of either physical or mental powers, the want of physical conformity is recognized in stunted growth, and in many instances distortion of the basement structure of the animal frame. The positions young stock are obliged to sustain for lengthened periods, from want of proper exercise, and from being in cramped positions, tend to inordinate length of some parts of the animal machine, and to a corresponding decrease in others. For a young animal—and it applies to every class—to be possessed of full bodily vigour, and for every part of the body to act in strict union with each other, *liberty is absolutely imperative,* or we shall have engendered those specimens of equine monstrosities which we find in every nook and corner. No matter how well laid out the scheme may be, no matter what talent we have at the back of it, it will fail, and fail entirely, if this one cardinal principle is ignored. Compare the treatment of young stock in this country to that of England, or any other country you like, where rational principles of rearing are adopted, and I ask you is it common sense reasoning to expect beneficial results to accrue? My own idea is that if Government wanted to make the enterprize a failure this would be one of the surest ways of bringing it about. We have then, in the way the horses of this country are reared, an ever recurring evil and one which will absolutely render inoperative any efforts of those who have in their hands the leading strings of horse breeding operations.

Horse-breeding operations were, I presume, instituted as a mutual benefit to Government and the breeding interest of this country. But as far as I can make out it is somewhat like the free trade policy adopted in England of exporting our best brood mares, *i. e.* the benefits are all on one side. It is true that Government is enabled to enter the open market and compete with outsiders in the purchase of stock; but this I maintain is not enough. Large sums of Imperial money have been spent in furthering the interest of horse raising, therefore we require a more direct return for the money, and this can only be accomplished by having a lien on all young stock. I would impose very strict regulations on this point, and no horse should be sold to outsiders until Government had the first look in. The sentimental argument of interference with the liberty of the subject may be advanced in a measure of this kind. But had I the manipulation of these matters nothing would deter me from having the first "pick of the basket." Sentiment is one thing, but business is another, and no private organization, no public company would ask its shareholders to forego their claims in such a case; so why should Government be so philanthropic? Measures of this kind would enable the horse breeding department to arrive at some true index as to what useful horses are being bred. At present many of the best animals are bottled up, and Government money is powerless in preventing it.

Rearing Depôts.

The system of rearing depôts or nurseries now demand attention. Leaving young stock in the hands of the natives is, as I have attempted to prove, a mistake. The formation of rearing depôts is a step in the right direction. But here again I must sound a note of warning. In selecting young stock, especially yearlings, the greatest skill and care are necessary, otherwise the subsequent weeding out process will be appalling. I know of no more difficult subject in connection with horses than this. In blood stock, so long as they have galloping points, they are chosen for the strains of blood which are coursing through their veins; yet how many thousands never earn a feed of corn! In the general utility horse we have even more difficulties to contend with; so intricate a subject is this that I scarcely know of half a dozen men in whom I should have sufficient confidence to buy me twenty or thirty yearlings. We know what a common expression it is to hear that a colt has "grown the wrong way" or that "he has not filled out as he ought." As a colt enveloped in milk fat he probably looked well, for there is nothing so deceptive as milk-fat, but the moment that fat becomes replaced by other tissues necessary for the performance of his duties in life, what a three-cornered, slab-sided brute he often shows himself to be. Milk-fat in other words hides a multitude of defects; nevertheless the principle of rearing depôts is decidedly sound, and it is the *only way* to prove that Mr. Hallen's machine can be satisfactorily worked. Management of nurseries requires skill and experience, here again the native element is out of the running. I need not dilate on such important points as aspect, soil, feeding, exercise, &c., all these things have doubtless been well worked out and leave nothing to be desired.

Stud Farms and Nurseries.

I will now furnish you with a brief outline of an undertaking which if started in this country must necessarily be successful or become a paying concern. The scheme is as follows;—That a tract of land suitable for horse raising be selected (and this can be found), possessing natural advantages in climate, soil, sufficient run, shade and water. Given these natural advantages it is not necessary to erect imposing buildings, the more freedom and the more horses approach a state of nature the better: nor is it necessary to have an army of men to look after them. All these things mean money and add to the colt's price.

Select a man from England or the colonies who has been a successful breeder all his life, such can be found and could be induced to come. Give him a fairly liberal salary and a premium on results. Take him into your confidence and make it worth his while to do his best. Such a man must be left, in large measure, to his own resources and not be worried by a dozen different fads and systems ; tell him what you want to produce and he will do it. A man of this class with a grain of ambition in his character would soon cause a change to come over stud farming in this country. Carry out the principles which I have already laid before you, for I flatter myself they are those of practical men.

All details must be left to the man in charge, and, if he be of the right stamp, he will see that the sires and dams are of the class suitable for producing good stock. He will, above all, select young dams, starting with advanced three year olds, (*i. e.* three and a half or rising four), and not indulge in that fatal policy of buying worn out old mares, many of which never produce a foal ; such animals have enough to do to support their own flagging nature. Time will not admit of my dwelling on the value of young dams. A mare is fit for breeding purposes at the above age, and by the time she is ready for the market she will in all probability have "thrown" one, if not two, foals. I could show you in figures how she costs but little during the first year of her stud existence, and how between four and five she pays for herself. This is a matter of detail and is of great importance in economic breeding.

I come now to the collateral assistance which must be afforded by Government. In the first place it must be willing to give over the necessary land for operations, and secondly it must also be prepared to farm out a proportion of its young stock in the hands of this private undertaking, paying the same rate as that which is laid down in the Government nurseries. The economic principles which are always practised in private concerns would enable this stud farm to make a profit and keep the pot boiling until a return from the brood mares was evidenced. Considering the demand for good horses of the general utility class there is in this country, and the good all round price purchasers are willing to pay, I have little doubt in my own mind that it would be a successful venture.

The CHAIRMAN : As it has been decided that there shall be a discussion after Mr. Cox's lecture, and as I believe it was Colonel Lance's wish to speak on this subject I will call on him to open the discussion.

Colonel LANCE, C. B.: I do not propose to criticise the able lecture that we have just been favoured with but to supplement it with some remarks on what I think you will all agree with me is the most important point now-a-days connected with the subject of horse breeding in India and that is the increase in the horse supply.

With your permission I will read you a paper that I sent to the India Office, early this year, at the request of Sir Peter Lumsden and I do so without hesitation because I understand that the paper and the correspondence to which it gave rise has not yet reached this country.

Horse supply.—The conviction of the urgent necessity of increasing the supply of horses in India has induced me to offer some suggestions prompted by observation and enquiries made into the practice of horse breeding in England and in other countries during a year's furlough.

Claims for giving an opinion.—My claims to give an opinion on the subject are, an experience of 30 years service with native cavalry, and of purchasing remounts for my regiment since 1859; a general knowledge of the working of the horse breeding department, from intercourse with officers of the department at fairs and in districts, and from having officiated as General Superintendent of the department for five months in 1887; and an experience of six months duty as president of the committee for purchasing native cavalry remounts in the Punjab in 1887-88.

Supply insufficient.—I can confidently state that the indigenous horse supply of India is inadequate to supply efficiently the present requirements, and that, in an emergency requiring a large increase in the mounted branches of the army, both British and native, the supply would prove quite insufficient, even if the present standard of quality and height were largely reduced.

Horse breeding department not to blame.—I consider that for the deficiency in numbers of horses in the country the horse breeding department cannot fairly be blamed as it is due to causes, which although capable of remedy, are outside the control of the department.

Practice of breeding from young fillies in England.—Although in India the Government stallions are not allowed to cover mares till they are four years old, I find that in the important horse breeding counties of Norfolk, Suffolk, and Cambridgeshire it is the custom of breeders to put their fillies to the horse at about two years old, so as to get a foal about three years old, a second is got at four years old, and after this one is weaned, the mare is fed up and sold at five years old. No consideration of the mare being a good foal-getter prevents the breeder from selling at five years old if he can get his price for her, and I am informed that it is only under this system that breeding half-bred stock can be made to pay in England.

Practice general among experienced breeders.—Not only is this system practised by ignorant farmers, but by large breeders such as Mr. Coker of Dereham, and his son Mr. James Coker of Earsham, who are probably the largest and most experienced breeders of Norfolk trotter stallions in England. I have visited the establishments of both of these breeders. At the farm of Mr. James Coker, I saw three year old mares with foals at foot, and brood mares bred from three year old dams, and could perceive no difference between the stock so bred, and stock bred from older dams.

I believe the practice of breeding from two or three year old fillies in breeding half-bred stock is very general throughout England.

No deterioration to stock or injury to mares from early breeding.—In no case have the breeders whom I have consulted stated that the stock has deteriorated in any way from having been bred from young dams, and they have all (with one exception) assured me that the future utility of the dams has been in no way impaired from their having produced two colts before they were five years old.

Dealers' opinion.—Dealers would soon discover any deterioration in stock bred in the manner described, but I do not understand, that in making their purchases they attach any importance to the age of the dam from which their purchases have been bred.

Practice in France.—In France, I have enquired the practice in the department of the Pas de Calais, and find that breeders do not put their fillies to the horse before they are three years old, but this is essentially a breeding district, and brood mares are kept for the purpose, as long as they will breed, and are not sold young as in England.

Practice in America and Australia.—In America the practice seems to be the same as in England, and in Australia where fillies run loose I conclude that they are covered on first coming into season.

Mr. Bond of North Petherton, Bridgewater, who after having bred horses in America for some years has commenced breeding in England, writes to me as follows :—

"I have been making some enquiries of breeders to see if their opinion bore out my own experience, which is that fillies bred from two to four years old produce the *best colts,* and that they do not show any lack of strength and stamina, and that without injury to the general working power of the dams, though of course it detracts a litle from the dams speed and size.

"I find this method of breeding is most generally followed both here and in America with very satisfactory results."*

Breeders have further informed me that fillies put to the horse at two years old are more sure to produce foals than those who commence breeding at a late age.

In England except in the winter dams and foals are turned out and get nothing but what they pick up in the fields, although some grain, hay and shelter is provided in winter.

Recommendation of trial of system in India.—I suppose that theoretically the practice of breeding from such young fillies is wrong, although cattle and other farm stock are similarly bred with success in England, but if this practice has been carried on in England without deterioration to the breed, it would be reasonable to carry out some experiments of a similar kind in India and I think measures might be taken to give them a fair trial.

Possible objections.—Besides the scientific and theoretical objections it might be urged that horse stock in England are better nourished than horse stock in India. Although in most districts in India the grasses may be less nourishing than English pasturage, Indian breeders feed up their stock more than it is the practice to do in England. In the Punjab certainly breeders worthy of the name invariably give their young stock green crops of some kind in the spring, and generally in the autumn, and at seasons when this is not procurable almost invariably supplement the dry forage with a little grain. Milk, flour, *ghi*, and raw sugar, are also frequently given, so that altogether the Indian dam and colt are fed, at any rate in good years, quite as well if not better than those in England.

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* I may here say that since writing this I made the acquaintance of Major Carter, agent to Lord Wantage who is a large breeder of shire horses. He informed me that their two horses that took many of the principal prizes last year were the produce of three year old dams, and also that Mr. Gilbey, one of the most experienced of English breeders, bred from young mares, and that a two year old mare that they had recently bought from him was already in foal.

Liberty for young stock.—I make no allusion to the different systems of rearing colts as regards liberty, as here unfortunately the Indian stock are at a great disadvantage.

Backwardness of Indian fillies.—It may also be urged against breeding so young in India that Indian fillies are more backward than English ones of the same age. In many instances this may be true, and unfortunately backwardness is more common among produce that is a cross of the imported horse with the country-bred mare, than with the pure country-bred, but notwithstanding there are large numbers of two year old fillies in India who are quite as matured in conformation as English fillies of the same age.

Advantages of system.—If such a system would answer in India its advantages are evident. The complaint made by Moorcroft that breeders sold their best fillies and bred from those that they could not sell, and that many of the brood mares were kept till they were too old, are as true now as they were at the time at which he wrote.

Breeders would probably breed from their best fillies if they could see their way to getting two good colts out of them, and then selling them at five years old for at least as good a price as they would have got for them at three years old. If such a system became general not only would the number of produce be largely increased, but there would be a supply of matured stock in the market which at present does not exist. That it does not exist is best proved by the fact that during the purchasing seasons of 1886-87 and 1887-88 the proportion in purchases of the Native Cavalry Remount Committee of remounts three years old and under, was over 60 per cent. and of the remainder a very small proportion were five years old.

Summary of advantages.—If the system could be successfully practised in India we should have the following advantages.

1.—An increase in the number of produce.

2.—Improvement in quality from the best fillies being bred from, and from there being no aged mares.

3.—A supply of matured stock in the market for army purposes.

Stallion thorough-breds.—The stock of the thorough-bred stallions now in use in India are often delicate in constitution and many of the produce turn out leggy, and so badly formed in some cases as to be useless for almost any purpose. Most of the thorough-bred horses bought for the Indian Government have been trained for racing as two year olds, and it is reasonable to suppose that the artificial state in which they, and probably their parents have been brought up, the severe work, and the almost inflammatory state they are in, when in training, affects their constitutions and will affect that of their produce.

If the stallions required for India were bought as yearlings, and brought up in this country till three years old, they would come to India with unimpaired constitutions, and would probably beget a stronger and better formed progeny.

It is doubtful whether the cost of thorough-breds so bought and reared even including the cost of some failures, would be greater than the cost of thorough-bred stallions bought as three year olds and over. Major-General Thornhill might be consulted on this point.*

More stallions required.—With the number of stallions now employed it is impossible to increase the horse supply of India. The practice of providing Government stallions and of giving their services *gratis* has reduced the number of country-bred stallions kept for profit by private individuals, and in some districts I have heard grave complaints from breeders of the difficulty of securing the services of a stallion of any kind for their mares, as the supply of Government stallions is seldom sufficient for the full requirements of the country.

The supply of cheap stallions in addition to the kinds now employed. It cannot be expected that the requirements of the country can be fully supplied by the imported stallions, but I think the present supply of costly stallions might with advantage be supplemented by cheaper horses procured from the following sources.

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* I have not seen General Thornhill's official remarks on this paper but I will read you an extract from a private letter written to me on the subjects put forward in this paper. I may inform you that General Thornhill is the gentleman who buys all the English stallions required by the Indian Government.

"I entirely agree with you both on the subject of breeding from two year old fillies, trotters, and on the purchase of thorough-bred yearlings.

"The system is universal in Norfolk and I believe throughout England in half-bred stock, and in its result neither dam nor produce are considered to suffer. I cannot see why the system should not succeed in India.

"No ordinary breeders can afford to keep an animal up to four years old to be then put to the stud. You are surprised that some of the best mares are not reserved for breeding. No doubt it would be well for the country, but the breeder's argument is that he cannot afford to have fancies, and probably in a mercantile view he is correct.

"You remark on several horses which you saw in Norfolk. You would have had "White Stockings" as a three years old except for his tail which is about three inches long. Whenever I saw this horse I accused old Coker of having done this to keep the horse from me!

"Now about T. B. yearlings. In 1887 I obtained permission to buy a few yearlings as an experiment, and I was satisfied from the result in a small way that the idea was correct.

"Then the preference in India for trotters became so marked that I did not continue it.

"In 1884 I proposed to continue this system if a regular supply of T. B. was likely to be required. I remarked that "the advantages are that the *successes* are genuine animals with constitutions unaffected by over training. The disadvantages that the failures (and failures there must be) can only be disposed of at auction at a sacrifice.

"This was sent to India. Hallen did not encourage the idea, and the Calcutta Government requested that nothing but *mature* animals should be purchased. There of course the matter ended. The demand for T. B. stock is so much on the increase, that I could not now hope to get very many yearlings at the price that I then fixed, viz., £150.

"Many of the mature horses which I have sent out of late have realized as yearlings at auction from £1000 to £1500. One even £3000!"

1.—The purchase of selected country-breds bought young and sensibly reared.

2.—The purchase in India of imported horses from private owners.

3 —The importation of half-bred horses from Australia.

With reference to this last class I beg to give the following extract from a letter from Major Gaisford, Bengal Staff Corps, on the subject. I can offer no opinion on the feasiblity of Major Gaisford's proposals but think that further enquiries on the subject might be made.

"Ten years ago I was in Australia. I visited Mr. Dangar's farm at Neotsfield, on the Hunters River, N. S. W. He is a large breeder of horses and had no less than five high class stallions and over 200 mares, mostly thorough-breds, on his home run.

"Amongst other subjects we talked of the supply of stallions for the Indian studs. He remarked that as we did not require racehorses, but simply well-bred, powerful horses with big bone, quality and substance, he wondered we did not purchase in Australia as they could be had there so very much more cheaply. The stamp of horse under question is generally gelt in the colonies; and to obtain stallions it would be necessary to select yearlings.

"The procedure would perhaps be in this wise. The Government representative would visit Australia annually, and call on certain of the large breeders who would show him their yearlings, and their dams. Such of the former as pleased him he would agree to purchase at four years old provided they were made over to him sound and in first rate order. The price would probably average £100 each. Mr. Dangar believed there would be no difficulty in getting as many animals as we wanted under these conditions, and that the breeders would be happy to supply *any stamp* of horse, *i. e.* Norfolk or American trotters, half or three-quarters Arabs, &c., on the same terms."

French system.—The cost of keeping up a large supply of stallions directly at the cost of the State might be lessened by imitating either wholly or in part the system pursued in France where the horse supply is largely on the increase as shown in the report of the Director of Haras for 1887.

In France three kinds of stallions are employed—

1.—Stallions the property of the State.

2.—Approved stallions the property of private individuals who are subsidized by the State, receiving from 300 to 500 francs a year.

3.—Authorized stallions the property of private individuals considered sufficiently good to serve mares for payment but receiving no subsidy.

Private individuals are forbidden by law to employ other than those of clause 2 and 3 as public stallions.

The services of Government stallions are charged for at various rates, but private owners of stallions charge what they please.

Might be introduced into India.—Cheap imported half-bred horses might be given or sold on easy terms to breeders and others, and used with country-bred stallions to supplement the Government stallions under rules somewhat similar to those in force in France.

Horse breeding department to carry out extension of present system.—The great improvement in the quality of the Indian country-bred that has been affected during the last ten years. may fairly he attributed to the wise and uniform system carried out by the department of horse breeding operations throughout the country, and should any extension of horse breeding be sanctioned the money would I venture to think be expended to greater advantage through the department, than through local bodies or officials whose experience must be little, and whose opinions and practice would be constantly changing.

And now, gentlemen, I will only detain you for a few minutes longer to touch on two matters that intimately affect the interests of horse breeding in this country.

The encouragement given to horse breeding by horse shows and the prizes distributed at them is most valuable and could not be dispensed with, but after all this system reaches only a few breeders, that is the recipients of the prizes themselves and those who witness or hear of their good fortune, but the two matters that I allude to are more general in their action, and touch every breeder of horses.

By the rules of this Institution I am debarred from discussing the first of these methods and will merely express my firm conviction that no greater encouragement to horse breeding could be devised than by casting to the winds all the present restrictions on the purchase of native cavalry remounts, and permitting commanding officers of native cavalry regiments to make their own purchases in their own way.

The second method is by providing breeders with a ready and liberal market for the sale of their young stock.

I need not tell the present company in detail, that a very large proportion of the young horse stock produced in the Punjab, and indeed in the whole of upper India, is bought up by Bhojpuria and other native dealers, and carried out of the country, and that very few, if any, of the stock so bought is offered for sale to Government purchasers.

The Government has for the last few seasons been buying young stock, but on a comparatively very small scale, and I think the time has now come for commanding officers of native cavalry regiments to make a general and earnest effort, by getting into the field before the dealers, to buy up largely and liberally the suitable young stock direct from the breeders.

When I was buying remounts two years ago I was also buying young stock, and breeders in different parts of country assured me that they could and would extend their breeding operations if they could be sure that a "sahib" would come round every year, and buy up their young stock as I was then doing.

I know that the cost of establishing breeding farms is far beyond the means of most native cavalry regiments, and the initial outlay in stocking rearing farms even is heavy. The cost of remounts reared in breeding farms will doubtless be greater than that of remounts bought in the open market, but at the same time I think that in the present scarcity such an outlay is justifiable, and may in the end prove to be economical, as the horse supply will assuredly be increased, and the horses so reared will be sounder and of better symmetry than those reared on native principles and will presumably therefore last longer.

There is not time to go into detail about rearing farms, but I would caution commanding officers starting a farm against expecting or even asking for special help from Government. Help as regards selection of suitable land will assuredly be given but don't ask for remission of revenue or of water dues, or if these must be obtained ask for them in the Military Department to be borne as a military charge. Mind I don't think you will get it, but if you act on this principle you will find that deputy commissioners and canal officers will give you far more willing and valuable help than if they thought you were afterwards going to ask them to disturb the symmetry of their yearly budget.

I think myself that the best method is to entrust young stock purchased to large land holders and farmers to rear at a fixed monthly cost. Such a system was started in a regiment which I am acquainted with and promised well, but I am sorry to say it has been given up for reasons of which I am ignorant. But I place some correspondence on the table showing that one farmer in the Punjab is willing and able to rear young stock for native cavalry at the very low charge of four rupees a month.*

Mr. J. H. B. HALLEN, I. V. D.: I have to mention in connection with Mr. Cox's lecture, that I fully endorse all he has set forth, with one exception, and that is, regarding the Arab horse. I can speak of the Arab with affection, as I regard his qualities of endurance and power for his size, and the good quality of his bone and limbs, as excellent; moveover, the true Arab, as a rule, with good mares, produces most useful stock. That the goodness of the Arab horse is becoming more appreciated in England, we have practical evidence, inasmuch as at the recent annual sale of Mr. Wilfred Blunt's pure Arab produce, bred at Crabbet Park, also that of the Arab stud of the Hon'ble Miss Dillon, the prices realized were 50 per cent. higher than those hitherto given.

With regard to the remarks made by Colonel Lance, suggesting the breeding from young fillies of two and three years old as carried on by horse breeders in England, I am aware that this practice has been in existence during the last ten years or so, and it has arisen from the desire to make horse breeding pay better. The cost of the young horse's feeding from two to four years of age is great, and so the English breeder allows the filly of two years to be mated, and thus obtains a foal from her at three years of age, and another at four years of age, and then sells her at five; thus, for the cost of the dam's keep from two to five years of age, he recoups himself with the prices realized by the sale of her produce. But it is questionable policy to allow a filly at two years, when quite unformed herself, to commence producing another animal, and thus, more or less, marring her own development to maturity, at the same time rendering the probability of the foal turning out of little value; still, as Colonel Lance has remarked, this practice obtains in England, and is said to answer: but the English breeder, who is generally a practical man, is careful to duly feed, indeed force, the young dam with plentiful and nutritious diet, in order that she may have every chance of developing her own frame as well as getting good produce. The native farmer of India who takes to horse breeding, as a rule, does not feed his young stock too liberally; indeed, advice, bordering upon pressure, has to be given in order to induce him to feed his young stock well; so it is not likely that he would successfully breed from two year old dams. I may mention that I have met with a few instances in Indian breeding districts, where two year old fillies have been allowed to breed, but they themselves have become wrecks, and their produce proved weak and worthless.

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* This correspondence is given in the Appendix.

The Chairman: It was my intention before closing this meeting in the usual way, to make a few remarks regarding the way in which the present horse breeding operations are affecting our cavalry regiments in India, but as the time is short I will content myself by saying that I fully endorse what Mr. Cox has said about the country-breds now being used in our cavalry regiments. With a few exceptions they are excellent horses and fully meet the requirements of the Service. I cannot, however, quite agree with him as to the Arab. I have served in a regiment where we had two to three hundred Arabs and I can never forget the way they worked in Afghanistan; when our Walers were dying off, our little Arabs kept in good condition. After we returned from Kelat-i-Ghilzai, where the weather was most inclement, the casualties from privation were, Arabs 2½ per cent., stud-breds 15 per cent. and Walers 25 per cent. I also remember how a horse artillery battery drawn by Walers was easily passed by a field battery drawn by Persians. I had intended to make a few remarks regarding the result that polo is having on horse breeding in India, as I am certain from what I hear that it is having a most injurious effect. When I was in Sind I found that many Biluch breeders and men from the Pishin valley were even then asking themselves whether it would not pay them better to breed polo ponies and give up breeding horses.

A vote of thanks was then given to Mr. Cox for his interesting lecture.

APPENDIX.

Correspondence on the subject of a grant of land in the Punjab to Mr. Broadway, for the use of a horse run.

From J. H. B. Hallen, Esq., General Superintendent, Horse Breeding Operations in India, to the Adjutant General in India, Simla, 30th November 1887.

In forwarding, for the consideration of His Excellency the Commander-in-Chief in India, the enclosed letter from Colonel F. Lance to your address, on the subject of urging the Punjab Government to grant Mr. Broadway 2,500 acres of land in the Multan district for the use of a horse run for rearing young stock for native cavalry, I have the honor to state that there is much in the proposal to commend the experiment as worthy of trial.

2. The establishing of private horse runs and studs, either by companies or individuals, should be encouraged and fostered. From what Colonel Lance states of Mr Broadway's eligibility to duly manage a horse-rearing establishment, it may be hoped that the run, as proposed, may prove a success.

3. But in order for the Government to secure every chance of it proving a real success, I would suggest that the land asked for may be granted free on lease for a period of seven years, and that, at the expiration of that time, in the event of the reports received from officers commanding native cavalry corps being to the effect that they have found their stock well reared on the run, the land may then be granted in perpetuity to Mr. Broadway or his successor; but only so long as the land be used as a horse-rearing run.

From COLONEL F. LANCE, President, Punjab Native Cavalry Remount Committee, to the Adjutant General in India, Simla, 23rd November 1887.

I venture to bring the following matter to the notice of His Excellency the Commander-in-Chief, as it is intimately connected with the duty upon which I am now employed.

2. Mr. A. Broadway, an owner of land in the Jhang district, applied for a grant of 2,500 acres of land irrigated by the recently constructed Sidhni canal, in the Multan district. As Mr. Broadway is a breeder of horses, and as I was aware that he intended to offer to run young stock for native cavalry if he secured this land, I represented demi-officially to the Financial Commissioner of the Punjab the desirability, in the interests of horse breeding, of granting Mr. Broadway the land in question. This representation was made in July last, when I was officiating for the General Superintendent of horse breeding operations.

3. I have recently heard from Mr. Broadway that the Government of the Punjab has not sanctioned his application for this land.

4. At my request Mr. Broadway has now written the letter, which I enclose in original, stating that he is prepared to rear young stock for native cavalry regiments at the rate of rupees four per mensem.

5. I think that the establishment of farms by private individuals, who can be relied on, for rearing young horse stock, is a good solution of the difficulty now experienced of retaining young stock for the use of native cavalry, and that Mr. Broadway's offer affords a good opportunity of trying the experiment.

6. Mr. Broadway was, I believe, led to hope that he would get a lease of 1,000 acres of land in the Multan district. This area is sufficient to run only from a hundred to a hundred and twenty young stock, as half of the land would be reserved for crops and forage, and the remainder only used as a run. Mr. Hallen informs me that, to secure immunity from the danger of virulent form of strangles and other

diseases consequent on the overcrowding of young stock not more than one colt to every five acres should be allowed on a run.

7. If the farm were established, the native cavalry regiments quartered at Multan, Rajanpur, Dera Ghazi Khan, and Dera Ismail Khan could each send about thirty head of young stock to be reared on it, and I think that Mr. Broadway's terms would be gladly accepted by regiments quartered there.

8. I think that the age of six months at which Mr. Broadway says they should be sent requires modification, and I have no doubt that Mr. Broadway would consent to receive them on the terms mentioned at any age not exceeding eighteen months, and that he would receive them above that age at a somewhat higher rate for keep.

9. I have no hesitation in assuring His Excellency that Mr. Broadway can be entirely and thoroughly trusted with the care of young stock.

10. If this proposal meets with His Excellency's approval, I trust that, in the interests of native cavalry, the Government of the Punjab may be urged to grant Mr. Broadway the land, that has I understand, been refused him, on the condition that he uses it for rearing young stock for native cavalry.

11. I have asked Mr. Hallen to favor His Excellency with his opinion on this proposal.

[DEMI-OFFICIAL.]

From ALEX. BROADWAY Esq., to COLONEL F. LANCE, President, Punjab Native Cavalry Remount Committee, dated Dera Ismail Khan, 3rd Nov. 1887.

I have thought over the conversation we had when you were here last, and made out all my calculations, and am prepared to start runs for colts and fillies belonging to say nine cavalry regiments, at an average cost of Rs. 4 per month for each animal; the regiments sending me their colts and fillies when about six months old, that is, as soon as they can graze. Of course I will employ a good *salutri*, and arrange for every convenience of the young stock, and have them all under my own supervision. As you are aware I have been breeding horses for the last ten years, and am fully conversant with their management, &c.

I have myself for some time been desirous of starting a run for colts and fillies which I intended purchasing as yearlings at the different horse fairs held in the Punjab, and with this view applied for 2,500 acres on the new Multan canal: but up to this have failed in getting the land. If Government would grant me land either in the Multan or Gujranwala district, capable of irrigation by canal, I should be glad to start the runs for the different cavalry regiments according to your proposed plan. There is no doubt it would be a good thing both for the regiments and myself, and if started I am sure of its success.

So far as I am concerned I am quite prepared to start the runs so soon as Government can be induced to grant me a sufficient acreage of land.

A PLEA FOR CLASS COMPANIES IN THE OLD COAST ARMY.

BY

CAPTAIN C. E. POYNDER,

District Staff Officer, Mandalay.

Efficiency for fighting purposes is the end of all military peace training and organization. Political, economical and other weighty reasons may militate against absolute perfection in this end, but given that these have due consideration in the composition and organization of the native armies of India, the point which this paper endeavours to emphasize is that caste, weak as its influence is supposed to be in the Madras Presidency, is not used as it might be for increasing efficiency, and that the so-called "absence of caste" is one of the indirect causes which has hindered advancement, and in some sense justified the term "benighted."

It will be said at once by those conversant with the southern army, "but caste is what we have always sought to destroy as the enemy to efficiency." It might be said in reply, "caste has been ignored in this hope, and the system has had a fair trial, but with what result? Is it stamped out, and does our efficiency contrast so favorably with other armies that we can afford to ignore their experience? If systems may be judged by results rather than theory, then the time has come when something more radical than the changes of the past twenty years must be attempted in order to secure efficiency. A great deal is heard of the old coast army and some seem content to rest on the laurels then won by it, forgetful that the march of time admits of no rest in matters military. Here, as in commercial affairs it is necessary to be up in the latest improvements, and to rightly estimate the causes of failure unless a backward place, the one now accorded to the Madras army, is desired.

The main cause why the army of to-day compares so unfavorably with that which fought under Wellington is, there can be little doubt, the system which substitutes a native officer of inferior education and birth for the British company officer, who, if less cultured than his brother of to-day, had at least the impartiality characteristic of his countrymen, and who made it his duty to see that justice was done to all under him, that each nationality and religion was given fair play. He knew his men and they respected him in return; a fellow-feeling and mutual confidence was established, which is as seldom found now as would be expected from races where justice was unknown, and money or the accident of birth was the sole passport to promotion.

This point is sufficiently demonstrated by the fact that the Madras Sappers, composed of the same elements as the infantry, and not, as some suppose of one class only, have won universal praise whenever employed, and bear on their roll a list of campaigns second to none in the native armies.

Reversion to the old system is considered by many the panacea for all the ills of the Madras army, and there is much truth in this, but both political and economical considerations unfortunately have greater weight with the civilian mind than efficiency, and since we are committed to a bad policy, any amelioration of it should at least secure a free hearing.

It is believed that a very real increase to efficiency might be effected by recognizing caste as in the corps of the northern army known as "class company" regiments, and thus subordinating each class to a native officer acquainted with the peculiarities of his men, and jealous that they should not compare unfavorably with men of, what he reasonably considers, another and inferior caste.

The excellent work done by the Madras Sappers will be instanced by many to show the possibility and desirability of retaining the "mixed company" system, but, as has been already shown, this is due solely to the fact that each sapper company has some four or five highly trained Europeans with it, and not to the admixture of castes. *Cœteris paribus* the same would be true of the infantry. It is the *absence* of European company officers which *necessitates* "class companies."

In putting forward this suggestion the writer is well aware that older and more experienced officers are opposed to the idea of recognizing caste, in the hope that it will gradually die out and cease to militate against that *camaraderie* which is so powerful an element for fighting efficiency in all European armies, and indeed now exists with "class regiments" of the Bengal army. It is proposed to show that over 20 or 30 years of the present system have failed to kill caste and that instead, it has almost killed efficiency. How much longer is the experiment to be tried, and what if Madras troops should be again required to meet a European foe? Will they acquit themselves as well as they did under Clive?

The degeneration of the recruiting material and the extraordinary development of arms of precision for purposes of destruction render it all the more necessary that every effort should be made to secure mutual confidence between the men and their officers. If the best leaders are to be denied us because of a few extra thousands to swell the military budget, or in the fond hope of raising a comparatively degenerate race to the position and culture of their English brethren, then let us have the next best thing—company leaders who at least understand and are understood by their men, and selected for the position solely by merit and not by the accident of seniority.

The Madras army is composed roughly of four great classes in the following proportions :

(*a.*) Muhammadans	$\frac{1}{4}$	(*c.*) Christians and other inferior castes	$\frac{1}{8}$
(*b.*) Tamils	$\frac{1}{4}$	(*d.*) Telugus	$\frac{3}{8}$

and these may be classified for fighting efficiency in the order stated. The Tamils and Telugus comprise in their numbers many high caste men with much social influence over those of their own religion.

It is clear then that if we could obtain class regiments wholly of Muhammadans or Tamils we should have all that we wanted. But the former are insufficient in numbers and the latter find civil employment so much more lucrative, that regiments are compelled to seek for recruits amongst the less civilized races of the Northern Circars, where labour is cheap, and the villages are fairly well stocked with old pensioners. These receiving an income from Government sufficient to keep themselves in comfort, and men arriving from their regiments annually on leave with the savings of a year or two to spend on their families, easily tempt away the youthful Telugu to seek his fortune in the army, assured that in the piping times of peace he will have little but "sentry go" to do, and in return receive his clothes and sufficient pay to put by a good sum against his first visit home.

Cleanly in appearance, well behaved and as a rule of excellent character these men do much to help a regiment in all but what it most needs, namely, *morale*.

The Tamil on the contrary is almost the counterpart of the Telugu. Untidy in appearance, quarrelsome by nature and with pugilistic tendencies he makes a good man in the field, but a poor competitor with the Telugu for promotion, as in peace he seldom has opportunities for displaying his good qualities, and conduct in peace is of necessity the qualification for promotion.

The Muhammadan of Southern India often combines the good conduct of the Telugu with an independence of character and zeal for his profession which makes him an invaluable soldier, but the existing organization does much to damp his ardour when his prospects of promotion depend on the caprice of a Hindu native officer, rather than his personal merits.

Encouragement therefore is needed to attract the Tamil recruit from his lucrative civil employment, and it seems not unlikely that the advantages of a "class company," where his national characteristics will receive some sympathy, would prove almost as strong an inducement as an increase of pay. But since the Telugu forms at present the majority of the recruiting material and is not well suited for fighting purposes, the necessity for an admixture of classes which give backbone for service is apparent; just as in Bengal regiments, a leaven of Punjabis, Sikhs, Dogras, &c., has always been introduced for a similar reason.

The question how this element can best be associated in each corps with a less warlike element has been settled in the northern army by what are known as "class company" regiments, and it may be said that the result has been satisfactory. The special advantages claimed for this system will be dealt with hereafter, but it is now proposed to show that caste both exists and is recognized in a half-hearted manner in the Madras army but that this middle course is as unsatisfactory as such measures usually are, resulting in anomalies which militate against efficiency and contentment.

It is difficult to see how it can be claimed for the mixed system that caste is or can be ignored. Men of different nationality, language and religion are brought together and expected to associate and cultivate company *esprit* when under no circumstances may the ordinary affairs of life be carried on together. Cooking must not only be performed separately, but even the utensils of one may not be used by the other. Strange to say Muhammadans are almost as particular in this respect as the Hindus. In one regiment on service in Burma it was observed that the Muhammadans refused beef rations because the Hindus objected to the chance of the kits coming in contact when packed on the mules, and in return the Hindus shared with the former their mutton ration. So that when, as often happens, beef alone is procurable the majority of the regiment were deprived of meat, and its work value, in order that a caste prejudice might be observed.

No comment here is needed on this custom being practised with the approval of good authorities in the Punjab, and other northern regiments, where concessions are made between Sikhs and Muhammadans of a similar nature. While good under certain circumstances, it cannot be urged that such arrangements are necessarily good always, because of increased difficulty in supply. It has not been a general custom in Madras, and its introduction might be discouraged with advantage, but its mention here merely emphasizes the statement that caste still exists and is recognized in regiments.

That the authorities recognize the necessity for class representation in the commissioned ranks was well demonstrated, in comparatively recent orders emanating from head-quarters, when it was observed how the superiority of the Muhammadans for holding subordinate commands had led to their obtaining an undue proportion of commissions and thus excluding from advancement the less soldierlike Hindus. This is an important point to notice in this connection, because under existing rules it may often happen in mixed companies that a good man of one class may be obliged to serve under a native officer of inferior education of another class, because he is awaiting a vacancy in his own. In class companies this undesirable state of things could never occur, since the company, the smallest unit of organization, will be always commanded by its own representative officers.

If mixed regiments claim to ignore caste, which is the only plea for their existence, (they have no other advantages), why should such care be bestowed to have each class represented in the non-commissioned and commissioned ranks? Why should not merit have its place and be the only just claim to promotion? If on the other hand it is to be rigidly observed in the commissioned ranks—as it most certainly must be to obtain good Hindu recruits, and encourage their advancement—why should not the system be carried out in its entirety and each class have its representative companies, where the peculiarities of each nationality and religion will be recognized and cared for?

The present system is thoroughly faulty in that it bears hardly on the very men who should be encouraged—the few suited for promotion, a matter in which every keen soldier is naturally most sensitive. To serve under a junior, of possibly inferior attainments, in the intimate relations of a company, for no better reason than to satisfy caste representation, is sufficient to damp the zeal of many a useful man, and, amongst the juniors, to convert a high spirited lad into a "ne'er do we'el." Whether in native or European races it is generally admitted that many of the Queen's "hard bargains" have material in them to make excellent non-commissioned officers had they only been taken in the right way at first, and the zeal and ability for mischief directed into better channels, instead of being fostered by a hard word or too severe punishment. Where classes are collected in companies commanded by their own native officers men would at least feel that they had a fair hearing and their national characteristics would be well known to the officers who first judged their conduct.

In Madras it has always been the custom to mingle races between whom apparently little antipathy existed and so long as the system of British company officers was in force, the defects of the plan were minimized, because impartial selection took place, and each individual knew that merit was the only claim for advancement. But since the introduction of the staff corps system when a native officer of one caste is called upon to consider the claims of men of three other classes, it is not surprising that discontent has grown up, efficiency has decreased, and recruiting has waned. In the nature of things oriental this state of affairs could only be expected, and has alone been tempered by British officers setting aside to some extent the recommendations of their company officers. In many cases such a course must result in antipathy between the native officer and the new promotion, and not infrequently ends in the down-fall of the latter on the arrival of a new British officer unacquainted with the circumstances of the case. Such a procedure must result in the native officer becoming more or less of a nonentity, of no real assistance to his wing commander, and little respected by men under him. The removal of this undesirable alternative would be greatly facilitated by the introduction of "class companies" where native officers could be better trusted to make good selections from their own class than from an alien race.

The Hindus of southern India are not less mindful of their religious creeds than those in the north, and if they are less tenacious about them in matters of discipline, and waive them when called upon to do so for the exigencies of the Service, it is because they are of a more docile character. This is in no way claimed as an advantage for fighting purposes, but it is at least a great consideration in organization and peace arrangements. Ignoring the fact of caste, although it has not, and probably never will result in open revolt, has its disadvantages and discomforts for the individual, which neither increases his love for the Service, nor his efficiency as a fighting machine. The Hindu of the Madras army will go anywhere and do anything in reason for officers he knows; but it is an unwise policy to assume that he will necessarily cast off the prejudices of centuries in peace time, because it is convenient to ignore caste. And now that our system denies him British officers who stay with the regiment, and we no longer have numbers of a good class coming forward for enlistment would it not be wiser to adopt a policy likely to attract good recruits.

The composition of Madras regiments has been dwelt on at some length to dispel the notion, so singularly prevalent, that our army is composed of English speaking Hindus of inferior caste. Officers of other presidencies have been heard to express surprise that any of the men are Muhammadans or could speak a language something like Urdu. The writer witnessed a curious discussion between a Bengal and Bombay officer which arose at the workmanlike appearance of a party of Madras lancers. Each claimed the cavalry for their own presidency, and would only be satisfied that they were really Madrasis by personal interview with the *duffadar*. To enlist the sympathy of the sister services in our desire to improve, as well as the assistance of those who alone can alter existing errors, a full statement of the case will it is hoped, not be considered out of place.

The disadvantages of the present system may be briefly recapitulated before proceeding to discuss some other advantages in the system now put forward for consideration.

(1.)—Amalgamation of classes prevents *camaraderie*, company *esprit* and therefore efficiency.

(2.)—Proverbial partiality of oriental characters renders justice between castes unlikely.

(3.)—Admixture of castes in peace causes discomfort, generates discontent and hinders enlistment.

(4.)—Likely men of independent character are passed over in favor of weak men of education, who are useless in the field.

(5.)—Native officers have no real authority, are little help to their officers, and gain small respect from the men.

(6.)—When responsible work is to be done a British officer has invariably to be detailed.

Seeing then that the present system has some very tangible objections it is proposed to now discuss some of the points which are obviously gained by the institution of "class companies."

Most men are agreed that the force of example is a great factor in efficiency. It is well demonstrated by the improvement which takes place in a regiment on coming to a large cantonment, where emulation to be the smartest corps in garrison is established. But to attain to perfection in all, a high state of efficiency must at least exist in one. The same spirit is necessary between companies, and is more likely to be generated where different castes are pressing towards the same end. From what has been said regarding the Muhammadan element in Madras regiments it will be seen that when collected in companies and regiments a far higher state of efficiency could be attained than when interspersed amongst men of other classes, many of whom have little zeal for efficiency or *esprit de corps*.

As an instance of what can be done with Madras Musalmans the musketry returns for 1888 placed the 3rd Madras Cavalry first on the list in India. In most infantry regiments three or four companies of Muhammadans could be found at once, and there is every reason to hope that the efficiency of these under equal advantages of training, would be incomparably superior to anything that has yet been attained of late years with mixed companies in Madras regiments. It is an axiom requiring no further proof that where a high state of efficiency can be attained in one company even, great benefits must result to the corps. The introduction therefore of class companies bears with it the promise of a brighter future than many now anticipate for the Madras army. Efficiency and *esprit de corps* are concomitant qualities mutually supporting each other; their presence in a regiment has a wonderfully attractive power in recruiting the class of men required for a fighting machine.

The obvious advantages of the "class company" system for purposes of rations and cooking on field service, as well as the reduction of packages and weight in cooking utensils, cannot be over estimated, but a typical instance of the way in which it may be adapted to meet the ever varying needs of active service calls for notice. During the recent Burmese campaign the necessity for mounted infantry arose, and volunteers were called for. The unit of organization was the section of 25 rifles, and it can be easily seen that the presence of two and three castes in so small a body led to much inconvenience. To mitigate the evil it was attempted to enlist only Muhammadans in the branch, but the attempt was not successful, principally from the fact that the class had already adapted itself to the companies in which placed by existing circumstances. The sections were therefore formed of such volunteers as came forward. The hardships attendant on frequent rapid marches to men wholly unaccustomed to riding, the heavy work in cleaning saddlery in addition to the arms and equipment of the foot soldier, and above all the grooming of ponies at the end of a long march when the ordinary infantry man is about to cook his food are sufficient to deter volunteers, when it is remembered that no remuneration whatever is offered in return. But in a regiment of "class companies" it would be possible to obtain sections of mounted infantry from one company; men accustomed to work together and mess together, and to whom the addition of a cook to prepare the food whilst the stable hour was being gone through, would be a real boon, and a decided attraction, were an inducement needed.

Another point in this connection must not be overlooked. Volunteers from different regiments and companies inconveniently upset interior economy; it seems a small point in peace, but those who have experienced it on service and know how officers are hampered by red tape, indents, receipts, and accounts can appreciate any simplication of these necessary evils. Men on service do not need to have their minds worried by the petty details of interior economy, and it cannot therefore be too strongly urged that all peace organization must be made subservient to service conditions. Simplicity is the keynote of efficiency; a religious adherance to complicated systems of accounts and supply exhaust valuable time, patience and energy of responsible officers, and hinder mobility. The less units of organization are disturbed in the field, the less will be the necessary complications of accounts which seem to some extent inevitable on field service.

When specially hazardous or arduous work is required of a regiment a point in favour of the proposed organization forces itself into notice. How many disasters in war have occurred through the misbehaviour of a company or regiment. Slight wavering in the few soon spreads to the mass, under certain conditions. Young and inexperienced men under a hail of bullets, before they have tasted the excitement of a charge, require very little to expedite their movement to the rear. The advantage then of having a staunch company to put in the van and rear is undeniable. Natives thrown together in a body such as a "class company" have a sense of honor which cannot be expected from those of alien races associated by the weak tie of a common uniform, but who have nothing to ally them when that is laid aside in the lines. Most men of one nationality can appreciate the honor of being selected for a special work and realize that self-respect is lost where little attempt to avert disaster is made. The temperament of some oriental races is too apathetic and indolent to care for distinction, however, and they cannot realize that sense of duty which enforces self-sacrifice even, in order that a particular post may not be surrendered whilst life lasts to hold it.

The mingling of such classes in every company cannot but have a detrimental effect on the mass and to entrust a difficult work to such material is to court disaster. Yet, notwithstanding the many indications recently afforded of the necessity of a change, nothing radical has yet been attempted in the Madras army. Many officers are in favor of the general scheme here put forward, and sanction is alone needed to give it a trial.

No attempt has been made to enter into details which must differ largely according to the classes already enlisted in each particular corps, but a trial might be made forthwith with regiments on "foreign service" if selection were made of corps whose officers were in favor of the idea, and capable of doing it justice.

In these days when the regimental system of officering regiments is rendered impossible by the difficulties inherent in the staff corps system, where officers are moved from corps to corps and men are losing heart at the continual change of faces in those to whom alone they can look for impartial treatment, it is more than ever important to have them united in homogeneous masses and commanded by native officers most likely to understand and lead them.

If there are strong points in favor of linked battalions in the home service, to minimize the disadvantages of continual change amongst officers and men, and the risk of sending them into action unknown to each other, *a fortiori* in the native army is it important to keep together men of like religions and language, under officers who understand their peculiarities of temperament, and can thus be a help instead of a hindrance to their British officers too often quite new to the regiment. It must not be forgotten that orders now conveyed in Hindustani are but imperfectly understood by half the company; it is hardly astonishing then that even in peace manœuvres a great want of intelligence in carrying out an idea is often apparent. The repetition of an order in three languages must be often impracticable.

The Madras army was denied the advantages of the Mutiny of '57 which destroyed the old order of things, and, like a fire in a pestilential town cleared away with it much that produced disease. A new order under younger men sprang into existence, built on the experience of past mistakes, and, not unnaturally, eclipsed in power anything that had preceded it. It is only in very recent years that men who distinguished themselves on our side against the mutineers have retired from the old coast army: it has never had that renovating change consequent on a great explosion. Its officers and the Government, alike conservative, have deprecated great innovations; and the improvements of recent years, borrowed from a newer generation and patched on to the old garment, have only proved under the strain of active service that something more radical is required.

The same material is available in the country, but it has not had the same treatment nor is it to be obtained so cheaply as in the days when the southern army distinguished itself. Some of the reasons of its degeneration have been shown, and to alter them all now would not be easy, but it is believed that the scheme proposed would influence efficiency materially without effecting in any way the present political questions involved in army reform or adding one rupee to the military estimates. To aid in this desirable end has been the main object in collecting the opinions of many officers both British and native of the Madras army.

THE COUPON SYSTEM

AS IT MIGHT BE APPLIED TO THE ISSUE OF RATIONS, &C., ON PAYMENT IN THE FIELD.

By Captain E. M. Nedham,

33rd Bengal Infantry.

Not long ago one hot weather when stationed in the north-west of India I was immensely struck with the advantages of the coupon system as pursued by an ice company in the sale of their ice.

The system was briefly as follows:—say X wanted to procure ice regularly from the company; he would buy at the office of the latter a book of coupons for one rupee; each book contained 32 coupons enfaced with the words "One seer of ice," each seer costing half an anna; for as many seers of ice as X required at any time he would send as many coupons, and the ice was supplied without any letter, order or writing of any description. The coupon books being paid for in cash avoided the necessity of accounts as between vendor and purchaser of ice.

Turning the above incident over in my mind lately it occurred to me that the system of coupons might be applied by Government advantageously on field service and elsewhere in the supply for instance of rations by the commissariat department, especially when issued on payment.

Officers and others who draw rations on payment in the field are put to a great deal of trouble, especially when at detached posts, in the matter of obtaining rations.

The indents have to be made out and a counterfoil kept, and besides being receipted in anticipation, the indent has to be endorsed with a certificate stating where credit of the value of the ration will be found. All this means clerical labour and waste of time which should always be avoided, especially on field service. Further the officer drawing rations, say when on detached duty, has to inform the quarter-master of his regiment of the quantity of rations he has drawn, who in his turn informs the adjutant (in a native regiment) of the necessary "cutting" to be made from the officer's pay and further the amount has to be credited to Government in the general state of accounts.

The coupon system would I think, nay I am certain, avoid all this delay, work and correspondence.

Officers and others drawing rations on payment under the coupon system, would purchase from the quarter-master or nearest commissariat officer books of coupons when detached from regimental head-quarters with a column or on some special duty; or similarly the quarter-master would purchase from the commissariat department books of coupons to be used by himself in drawing rations for the officers at head-quarters.

There would have to be three separate series of books for officers and others drawing European rations, for private followers, and for private chargers and ponies, each printed on different coloured paper.

The books need not be bulky, about the size of ordinary packets of luggage labels, say two by three inches, and might contain 10, 20 or 50 coupons as may be found necessary. The coupons should be perforated about ¼ of an inch from the binding of the book to admit of their being readily torn off when wanted without loosening the remainder. I would recommend each coupon being issued for, and convertible into, at least three days rations for officer, servant or charger, as the case may be, bearing on its face words similar to those I have noted in margin, because it is always necessary to have at least three days rations, and to have a coupon for each single ration would entail the necessity of an enormous amount of coupons to be carried about. The coupons might have serial numbers, like cheques, but no writing or signing would be necessary, as the rations having been already paid for in advance by the purchase of the books, it would not greatly matter to Government in the person of the commissariat official supplying the rations who submitted the coupon. A book of 10 coupons, of three days each for a British officer would therefore cost Rs. 15, and would be sufficient for a month. No correspondence would be required between an officer and the quarter-master or between the quarter-master and the adjutant of the regiment as regards deduction from pay and credit of sums for rations to Government, and there would be no preparing and signing and endorsing of indents and counterfoils. It would only be for the officer or other individual to keep in a safe place his coupon book and for the commissariat official to take good care of the coupons, for which he has given rations, in the same way that he now looks after his indents. The system briefly sketched here might I am certain be only slightly elaborated to render it applicable advantageously to the issue of free rations, and especially of rum and malt liquor, and in fact to the issue of other supplies by Government departments.

Field Ration.
European.
Three days.

Field Ration.
Private Follower.
Three days.

MUSKETRY FIRE IN THE HILLS.

BY MAJOR A. J. WATSON,

Garrison Instructor, Ranikhet.

The question of up and down-hill firing is one upon which little appears to have been written, and as far as musketry fire is concerned nothing is at present laid down on this subject in the text books. The Treatise on Military Small Arms dismisses the subject in these words. "Military rifles are always sighted for horizontal distances, and it is sometimes asked if the graduations on the back-sights would be correct in firing at objects at the same distances, but at a much higher or lower level. The answer is not a simple one, as it can be shown that in a vaccuum the sighting for certain angles, both above and below the horizontal, agrees with the horizontal sighting, while for other angles there is a difference; the question is further complicated by the resistance of the air; at moderate ranges the ordinary sighting may be taken as sufficiently accurate." Words which would imply that the subject was one not worthy of having much attention bestowed upon it.

It is strange that this should be the feeling on the subject in these days when so much attention is given to everything else that bears upon musketry, when books are published every day which discuss the allowances to be made for wind, weather, height above the sea, fouling, and even the effect of a passing cloud, and when any practised rifle shot can tell the elevation required under almost any circumstances to the hundredth of an inch.

But if one comes to ask what effect will be produced if the range be sloping instead of level we at once find ourselves involved in uncertainty, and will receive answers somewhat as follows:—

"I don't suppose it can make much difference," or, "I have never tried myself but it stands to reason you must want less elevation firing down hill and more firing up," this latter assertion is sometimes accounted for by the greater resistance of the air, sometimes by the force of gravity, this force being occasionally credited with extraordinary powers, for example in the course of correspondence on the subject of this paper I have seen it asserted that if a bullet were fired vertically from a Martini-Henry rifle it would not (so great is the force of gravity) go 1000 yards up in the air. If this were the case it would render a balloon reconnaissance a feat of small risk.

However to leave opinion we will now come to the conditions of the problem itself, and I hope to be able to give a solution of it which, though not claiming rigorous mathematical accuracy, gives, I think, a sufficiently near result for practical purposes. The general conclusion which I have arrived at is this, that, while it is true that more elevation is required when firing up hill than when firing at the same distance down hill, yet that in both cases, less elevation is required than would be the case if firing at the same distance on the level.

I will then refer to the results of some experiments which, through the kindness and courtesy of Mr. Coldstream, the Deputy Commissioner, and the municipal and police authorities, and with the able assistance of Captain Hayden and several members of the 2nd P. R. V., I have recently carried out at Simla. A comparison of the elevation found to be necessary in each case with that arrived at by the theory will I hope show the practical soundness of the latter.

At the risk of being tedious I will now go through the steps of the calculation by which the results are arrived at, and will endeavour to do so in as few words as possible.

The object of giving elevation to a rifle as every one knows is to counteract the fall of the bullet below the line of fire, which is due to the force of gravity, this force when the range is horizontal, acts at right angles to the range and any change in the amount of this force will make a corresponding change in the elevation required. Thus the reduction of elevation necessary, when firing at a considerable height above the sea is to a slight degree due to the reduced force of gravity as well as the greater rarification of the atmosphere.

We must observe that it is the effect of the force drawing the bullet down to the range that has to be allowed for, and acting at right angles to the range, that has to be counteracted by the elevation of the rifle.

Now when we come to a sloping range, if, according to the well known principle of the resolution of forces, we resolve the force of gravity into two parts, one parallel to the direction of the range, and the other perpendicular to it, both of these resolved parts will be less than the force of gravity since in a right angled triangle the side opposite to the right angle is greater than either of the other two sides. Therefore when firing on an inclined range the force drawing the bullet from the line of fire (*i. e.* the resolved part perpendicular to the range) is less than that when firing on the level, which is the whole force of gravity. At the same time the other resolved part of the force of gravity, that parallel to the range, will act against the general direction of the bullet when firing up hill and somewhat increase its time of flight, and consequently the time during which the force drawing the bullet from the line of fire acts, and when firing down hill the reverse will be the case.

The calculation is as follows :—

Let the slope of the range be A°.

The resolved part of the force of gravity perpendicular to the range will be $g \text{ Cos. } A^\circ$ and that parallel to the range $g \text{ Sin } A^\circ$.

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By Major A. J. WATSON,

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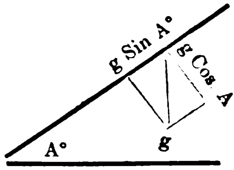
The calculation is as follows :—

Let the slope of the range be A°.

The resolved part of the force of gravity perpendicular to the range will be g Cos. A and that parallel to the range g Sin A°.



Let R be the range in feet.
v ,, mean velocity of the bullet.[*]
t ,, time of flight in seconds.
g ,, force of gravity.
H ,, drop of the bullet.

we have $H = \frac{1}{2} g t^2$; but $t = \frac{R}{v}$

$$\therefore H = \frac{1}{2} g \frac{R^2}{v^2}$$

Now let t_1 , t_2 be the times of flight when firing down and up hill respectively on a range equal to R, but sloping at an angle of A°.

The change of velocities at the end of these times due to the resolved part g Sin A° will be g Sin A° t_1 and g Sin A° t_2 respectively, and the change of mean velocities during the whole of these times will be $\frac{1}{2}$ g Sin A° t_1 , and $\frac{1}{2}$ g Sin A° t_2 respectively and therefore the mean velocities of the bullet in the two cases will be

$v + \frac{1}{2} g \text{ Sin } A^\circ t_1$, down hill, and
$v - \frac{1}{2} g \text{ Sin } A^\circ t_2$, up hill,

but the time of flight is equal to the range divided by the mean velocity, therefore we have

$$t_1 = \frac{R}{v + \frac{1}{2} g \text{ Sin } A^\circ t_1} \text{ and}$$

$$t_2 = \frac{R}{v - \frac{1}{2} g \text{ Sin } A^\circ t_2}$$

Now since $\frac{1}{2}$ g Sin A° is very small compared with R and v[†] and as t_1, t_2 differ but slightly from t , they may without sensible error be replaced in the fractions by t , we therefore get

$$t_1 = \frac{R}{v + \frac{1}{2} g t \text{ Sin } A^\circ} \text{ and}$$

$$t_2 = \frac{R}{v - \frac{1}{2} g t \text{ Sin } A^\circ}$$

Taking the case of firing down hill and substituting for t, $\frac{R}{v}$, and inverting we have

$$\frac{1}{t_1} = \frac{v + \frac{1}{2} g \frac{R}{v} \text{ Sin } A^\circ}{R}$$

---

[*] This was approximated in the calculation by taking the initial and final velocities as given in the Musketry Regulations page 237, and taking the mean, thus for 400 yards,

Initial v = 1315
v at 100 yards = 1167
,, 200 ,, = 1053
,, 300 ,, = 982
,, 400 ,, = 922

5 | 5439

Mean v = 1087

[†] It varies between 0 and 16·1 feet.

$$= \frac{v}{R} + \frac{1}{2} g \frac{\text{Sin } A^\circ}{v}$$

Squaring both sides

$$\frac{1}{t_1^2} = \frac{v^2}{R^2} + \frac{g \text{ Sin } A^\circ}{R} + \frac{g^2 \text{ Sin}^2 A^\circ}{4 v^2}$$

The value of the last term is so small that it may be neglected, we therefore get

$$\frac{1}{t_1^2} = \frac{v^2 \times R g \text{ Sin } A^\circ}{R^2}$$

$$\therefore t_1^2 = \frac{R^2}{v^2 + R g \text{ Sin } A^\circ}$$

Now we have seen that the force drawing the bullet down perpendicularly to the range is g Cos A, and it acts for a time t_1; therefore if H_1 be the distance the bullet is drawn from the line of fire towards the range we have

$$H_1 = \frac{1}{2} g \text{ Cos } A^\circ t^2_1$$

$$= \frac{1}{2} g \text{ Cos. } A^\circ \frac{R^2}{v^2 + R g \text{ Sin } A^\circ}$$

but $H = \frac{1}{2} g \frac{R^2}{v^2}$

$$\therefore \frac{H_1}{H} = \text{Cos. } A^\circ \frac{v^2}{v^2 + R g \text{ Sin } A^\circ}$$

But if E_1 be the elevation required to counteract H_1 we have $\frac{E_1}{E} = \frac{H_1}{H}$

$$\therefore \frac{E_1}{E} = \text{Cos } A^\circ \frac{v_2}{v^2 + R g \text{ Sin } A^\circ}$$

or

$$E_1 = E \text{ Cos } A^\circ \frac{v^2}{v^2 + R g \text{ Sin } A^\circ}$$

or in other words the elevation required when firing down hill will be equal to that required on the level multiplied by the cosine of the angle of the slope, and by the fraction $\frac{v^2}{v^2 + R g \text{ Sin } A^\circ}$

Similarly E_2, the elevation required when firing up hill will be equal to

$$E \text{ Cos. } A \frac{v^2}{v^2 - R g \text{ Sin } A^\circ}$$

The practical calculation of these quantities can be performed by a clinometer which I proposed at the end of 1887. An inspection of it will show that the value of E Cos. A° (which is the base of a right angled triangle of which E is the hypotenuse and A° the base angle) is given at once by the clinometer, while the corrections due to the fraction $\frac{v^2}{v^2 + R g \text{ Sin } A^\circ}$ are given in the table on the back of the gauge.

The value of this fraction was found to decrease from ·994 at 400 yards range and 10° of slope, to ·908 at 1000 yards range and 60° of slope.

This fraction being less than unity the correction in the case of down hill firing is subtractive.

Similarly for up hill firing the correction due to the fraction $\frac{v^2}{v^2 - R\,g\,\text{Sin}\,A^\circ}$ is additive.

The excess of the latter fraction above unity is so nearly equal to the defect of $\frac{v^2}{v^2 + R\,g\,\text{Sin}\,A^\circ}$ below unity, that for the sake of simplicity one set of corrections are given for the two cases.

The clinometer thus practically calculates the value of the expressions $E\ \text{Cos.}\ A\ \frac{v^2}{v^2 + R\,g\,\text{Sin}\,A^\circ}$ and $E\ \text{Cos.}\ A\ \frac{v^2}{v^2 - R\,g\,\text{Sin}\,A^\circ}$ for each range and slope. The only things which have to be ascertained independently being E, the elevation that would be required for the same distances on the level.

The principle of this clinometer has met with a good deal of criticism, to which the best answer I can give is to compare the results of the actual practice carried out, to which I have referred, with the results given by the clinometer.

The ranges experimented on were

Down hill at Kaithu.

A. 715 yards at a slope of . ... 26° 46′
B. 1,110 ditto ditto ... ... 24° 35′

Up hill at Sanjauli.

C. 850 yards at a slope of ... ... 27° 52′
D. 960 ditto ditto ... ... 28° 45′

It was found impossible at Simla to obtain steeper slopes of sufficient length.

The elevations are expressed in hundredths of an inch, as they can thus be easily applied to any rifle by an ordinary vernier.

It must be remarked that the elevations spoken of are the total height of the back-sight above the top of the fore-sight, while the ordinary verniers are graduated from some higher point. The difference for any vernier can be found by measuring the elevation for 1000 yards given on the back-sight of a H. M. rifle, the amount of elevation shown deducted from 125, (the total elevation of the 1000 yard line above the fore-sight) will give the correction to be applied to all readings of that particular vernier.

Now the correct elevations for level ranges of the same length as the above sloping ranges were found from a series of experiments on the measured ranges at Annandale to be

71·9
134·8
90·34
and 107·28 hundredths of an inch respectively.

The elevations for these distances on the respective slopes down hill for A and B, and up hill for C and D were calculated by the formula given above to be

61·83
115·47
83·61
and 99·17 respectively,

and the elevations found by independent experiment on these ranges were found to be
63·62
113·70
83·35
and 98·10 respectively.
The error in each case being
— 1·79
+ 1·77
+ 0·26
and + 1·07 respectively.
these errors are equivalent at the target to errors in elevation of
— 1·6 feet
+ 2·2 „
+ 0·2 „
and + 1·3 „ respectively or to errors in range of
— 12 yards.
+ 9 „
+ 1·7 „
and + 7 „ respectively.
Which are errors that might be caused at those distances by a slight change in the wind or the light.

For the sake of simplicity I have prepared a table which shows at once the correction in yards or $\frac{1}{100}$ths when the range and slope are known. *Vide* Appendix.

I do not suppose for a moment that such accuracy in the adjustment of the sight or anything approaching to it would be possible on service. All I propose in this paper is to draw attention to the law in accordance with which the sighting of the rifle is affected by the elevation or depression of the object above or below the firer and I think it will be admitted that a knowledge of the law, even approximately, cannot fail to increase the effect of fire on steep slopes, especially at long distances, and in cases where the fall of the bullets cannot be observed.

APPENDIX.

Elevations required on sloping ranges, given for each 100 yards and 10° of slope. Elevations for intermediate distances and slopes must be calculated from those given.

TABLE A.—Giving elevations in yards; the upper figure to be taken for up-hill, the lower for down-hill firing. The first column gives the elevations of the back-sight that would be required if firing under the same conditions of atmosphere, light, &c., the object being at the same distance, and the range *horizontal*.

Correct sighting for the distance on a *horizontal* range.	Angles of slope, up or down-hill.					
	10°	20°	30°	40°	50°	60°
500	495 487	473 458	434 414	388 350	...	...
600	546 585	566 544	536 507	478 439	426 388	...
700	697 683	676 648	634 596	572 527	484 430	351 318
800	798 780	779 742	736 687	672 609	581 517	450 385
900	902 876	880 834	836 779	765 685	673 594	542 462
1000	1007 980	983 929	936 860	860 770	765 669	623 525
1100	1107 1068	1083 1023	1040 945	...	...	...

TABLE B.—Giving the correction in $\frac{1}{100}$ths of an inch (vernier scale) to be deducted in each case from the elevation for the same distance on the level. The upper figures to be used when firing up hill, the lower when firing down hill. N. B.—The correction for 900, 1000, and 1100 yards at 10° up-hill is additive.

Correct sighting for the distance on a horizontal range.	Corresponding elevation in $\frac{1}{100}$ths of an inch (vernier scale). The elevation for 1000 yards being 125.	Angles of slope up or down-hill.					
		10°	20°	30°	40°	50°	60°
500	54·5	0·5 1·0	2·5 4·0	6·5 8·5	11·5 14·0	• •	• •
600	66·0	0·5 1·0	4·0 6·0	7·0 10·5	14·0 17·0	18·5 22·0	• •
700	78·5	0·5 2·0	3·0 6·5	8·5 13·0	16·0 21·0	25·5 31·0	38·0 40·5
800	92·5	0·0 3·0	3·0 8·0	9·0 16·0	17·5 25·5	29·0 36·0	43·0 49·0
900	108·0	+0·5 -4·0	—3·0 10·0	10·0 18·5	20·5 31·5	33·0 43·0	49·0 57·0
1000	125·0	+1·0 —4·0	—3·0 12·0	11·0 23·0	23·0 37·0	37·0 50·5	56·5 67·5
1100	143·0	+1·0 —5·5	—2·0 14·0	11·0 27·5	• •	• •	• •

NATIVE TROOPS IN TONQUIN.

The following translations of extracts from '*Le Cochinchinois*' gives some idea of the unsatisfactory state of the native army in Tonquin.

"Annamite law makes military service obligatory. Each village has to furnish a certain number of men, and to pay and support them whilst under arms. The village is responsible for the soldier, if he deserts, or becomes unfit for service, it has to supply a substitute." Such was the state of affairs before the arrival of the French. The writer goes on to say "Have we known how to profit by these wise Annamite regulations? Unfortunately not. When we arrived circumstances compelled us to act quickly. We were obliged to recruit wherever we could. Consequently the *tirailleur* regiments were composed of very indifferent men, who in peace time often became the accomplices of pirates (*Anglice* dacoits), selling them arms and ammunition, warning them of our intended movements, &c." The remedy for this in the opinion of the writer is to adopt the Annamite system of village responsibility, and apparently to form a sort of local militia.

The subject is receiving much attention both in Tonquin and in France, and in May last it appears the Under Secretary of State for the Colonies had before him a project for remedying these evils, as well as for reducing the number of French troops in Tonquin.

"The decree of the 16th February 1886 fixing the conditions of service of the *Tirailleur Tonkinois* has not given satisfactory results. The number of deserters has increased, and gradually the majority of discharged soldiers have joined the dacoits. This constitutes a grave danger, which it is necessary to remedy without delay by modifying the system of recruiting so as to retain men under the colours as long as they are worth anything.

The *tirailleur* having during his three years service contracted extravagant habits which he can no longer satisfy when discharged will always have a tendency to join the dacoits in order to live at the expense of others.

The project now before the Under Secretary, and which will probably be adopted, offers bonuses and pensions which will probably suffice to keep men in the service for 15 years. According to these proposals a regional system will be adopted, and under the old Annamite law each commune will be responsible for its contingents. The strength of these contingents and their distribution will be fixed by the Governor-General in consultation with the general commanding the forces. The period of service with the colours will be 3 or 5 years. The men presenting themselves must be between 21 and 28 years of age. On completion of the obligatory period the men may re-engage but they cannot remain in the service more than fifteen years. Non-commissioned officers and soldiers who re-engage receive the following bonuses :—

(1)	For a first re-engagement of 5 years...	... 60 francs.
	For a first re-engagement of 3 years...	... 30 francs.
(2)	For a second re-engagement of 3 years	... 30 francs.

Native soldiers of all grades who reckon 15 years colour service are entitled to pensions at the following rates :—

Soldiers	150	francs per annum.
Corporals	200	ditto.
Sergeants	220	ditto.
Sub-Lieutenants	250	ditto.
Lieutenants	300	ditto.

Or in Indian phraseology from five to ten rupees per mensem according to grade, so that for the common soldier or sepoy at all events the terms are more liberal than those we offer after 21 years service. These rules it was intended to bring into force from the 1st of June 1889. Their effect it was hoped would be to stop the recruitment of the rebel ranks and to permit the return to France of the greater part of the European troops.

E. G. B.

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